

Coal Age

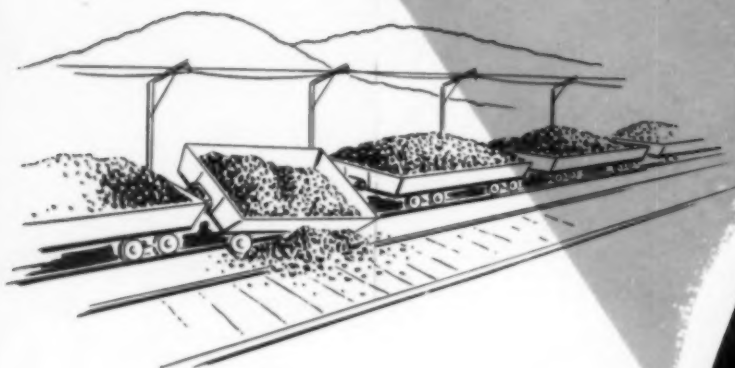
DECEMBER, 1954

A MCGRAW-HILL PUBLICATION—PRICE 50c



Railroading With Coal . . . p 50

answer to 'splitting' headaches



NEW 'LOAD SUPPORT' MINE CAR WHEELS

STOPS TREAD SPLITTING because new type curved plates give treads full support at center of loading.

STOPS "BREAK-OFFS" because overhang of wheels is reinforced by more metal.

REDUCES "FLAY SPOTS" AND "LOAD LIFTING" because treads are ground concentric to the bore.

WEARS LONGER because treads are QUICK CHILLED into a harder, uniform abrasive-resistance across full tread surface. This also assures longer-lasting rotundity.

DELIVERS MORE SERVICE ...can take more punishment... because all sizes feature heavier, more rugged construction.

COSTS COMPETITIVE WITH ORDINARY WHEELS. Yet results in fewer replacements...fewer work stoppages...improved "runability" that takes less power.

Your nearby Q C f Representative will gladly give you all the latest facts about this great new advancement in mine car wheels. And remember, he can save you money on replacements for *any* part of your mine cars. Q C f Industries, Incorporated, New York • Chicago • St. Louis • Cleveland • Philadelphia • Washington • San Francisco • Berwick, Pa. • Huntington, W. Va.

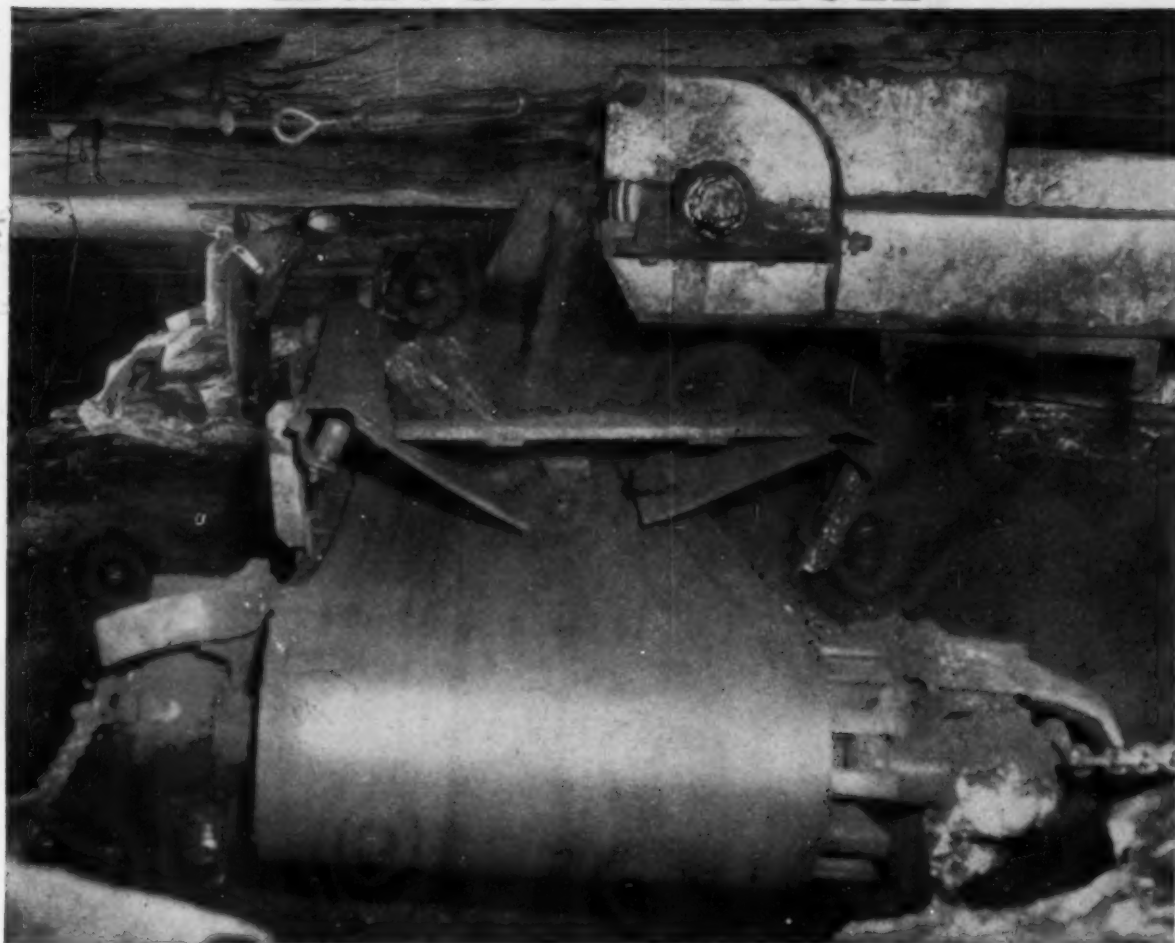


Q C f
MINE CARS
for Constant Haulage

RESEARCH KEEPS

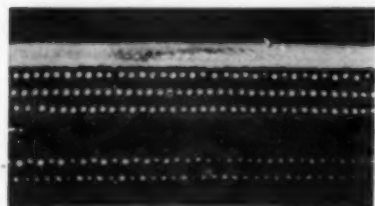
B.F. Goodrich

FIRST IN RUBBER



Mildew-resisting cord belt lasts 2½ times longer in "wet" mine

THAT belt has just run through water on its return from hauling chunks of coal to the mine railway. Wet operations like this cause mildew which quickly spreads across ordinary belts weakening them to the breaking point. There are two reasons why this can't happen to a B. F. Goodrich cord belt.



In this B. F. Goodrich belt there are plies of parallel cords, running lengthwise, built into both the top and bottom of the belt. Each cord is completely surrounded by rubber—no cross threads tie them together (see cross section). A cut in belt admits moisture or damaging acid to only those few cords exposed. There are no cross cords to wick moisture across belt width. No other conveyor belts are made like this.

As an added protection, B. F. Goodrich cord belts are treated with mildew inhibitors. These chemicals act directly on fungus spores, effectively protect belts against mildew.

That's why the B. F. Goodrich belt in the picture was chosen by the mine

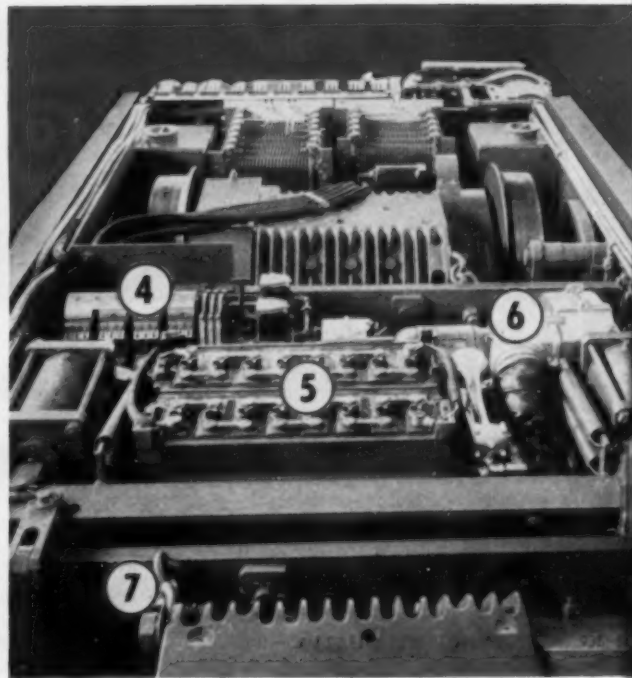
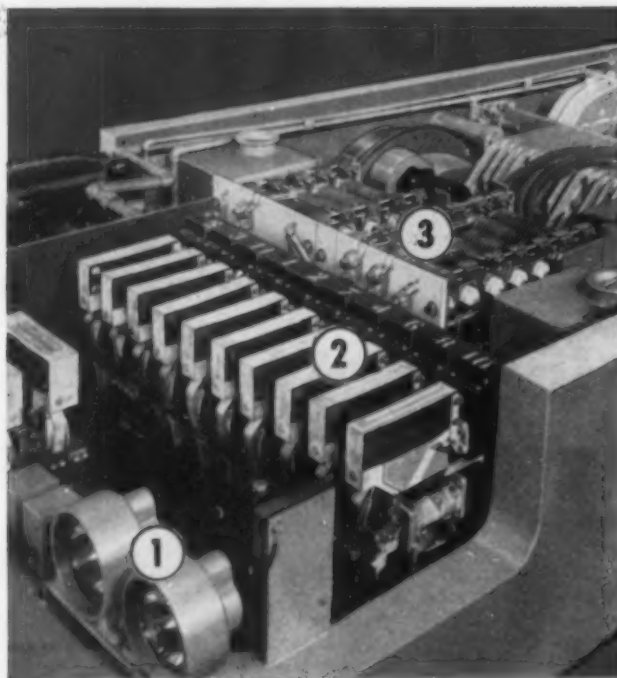
operators. And it has paid off. The belt has carried 3½ million tons over an 11 year period. Other belts on this same job lasted only 4 years.

If exposure to moisture and mine acids is shortening the life of your coal-handling belts, you need a B. F. Goodrich cord belt. Let your BFG distributor show you how these longer-lasting conveyor belts can save you money. The B. F. Goodrich Company, Dept. M-341, Akron 18, Ohio.

B.F. Goodrich
INDUSTRIAL PRODUCTS
DIVISION

for top performance . . . economy . . . safety

buy your next mine locomotive from the INSIDE



1. Sealed-beam headlights have 150-watt prefocused lamps. Good lighting assures convenience and safety.
2. Bank of 12 air-operated contactors saves space; air gives high tip pressure that increases capacity. Air contactors take small wattage, permit 32-volt battery control.
3. Continuous steel-strip resistance withstands hard knocks, eliminates many electrical troubles, affords maximum ventilation. Rod connectors to asbestos terminal board are all-nickel.

4. Space-saving air-operated reverser.
5. Battery for auxiliary power provides for dynamic braking and headlights if trolley pole jumps wire.
6. Blower to ventilate motors increases continuous capacity.
7. Safety chains prevent motor dropping to tracks should supporting hanger break.

Look at a few of the *inside* features next time you want a mine locomotive, and you'll buy Jeffrey!

Take the 30-Ton Separable Tandem Trolley Locomotive shown. This powerful main-liner is only 30" high, has a rated drawbar pull of 15,000 lbs. at 8.4 MPH. It is designed specifically for dependable daily service in low coal.

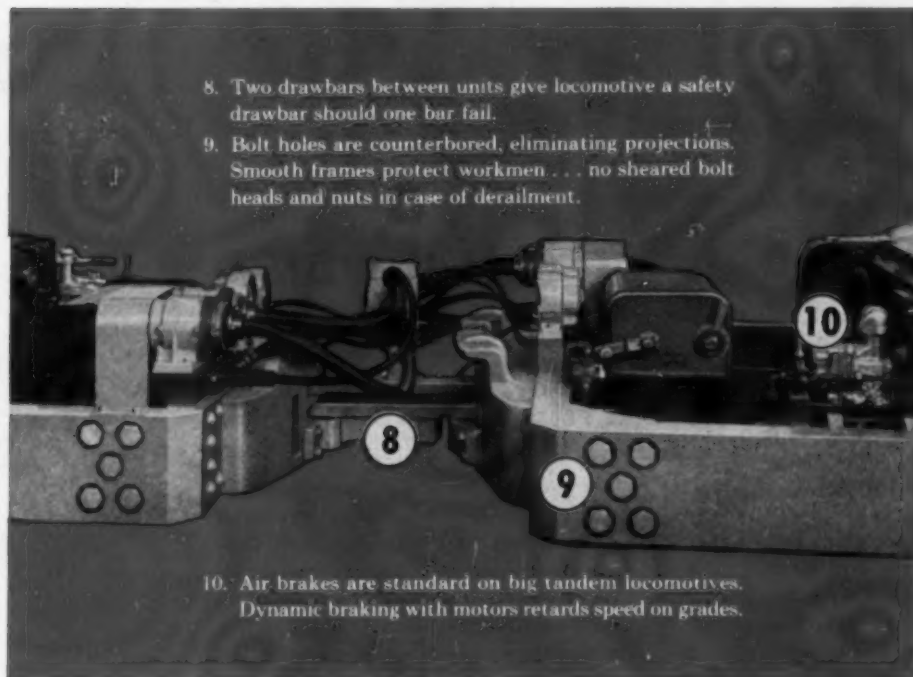
OUT

The "inside story" tells why this 30-Ton Jeffrey locomotive hauls big loads better, offers operating economy, is safer and more convenient for miners.

Behind a record of excellent performance is careful workmanship . . . rugged simplicity . . . orderly arrangement of components . . . easy accessibility to parts . . . fine construction features.

The close-ups on these pages reflect this locomotive's fine quality. Quality like this is characteristic of Jeffrey's complete line of trolley, cable reel and battery locomotives for main line or secondary duty.

Next time you have a mine haulage problem, call on Jeffrey. Write for Catalog 836 today and get the full facts, *inside and out*, on Jeffrey mine locomotives.



- 8. Two drawbars between units give locomotive a safety drawbar should one bar fail.
- 9. Bolt holes are counterbored, eliminating projections. Smooth frames protect workmen . . . no sheared bolt heads and nuts in case of derailment.

The 30-ton locomotive at top left can be operated in tandem from either unit, or units can be separated and operated independently. Jeffrey also builds 16, 22, 40 and 54-ton tandem locomotives.

- 10. Air brakes are standard on big tandem locomotives. Dynamic braking with motors retards speed on grades.



THE JEFFREY


**IF IT'S MINED, PROCESSED OR MOVED
...IT'S A JOB FOR JEFFREY!**

ESTABLISHED 1877
MANUFACTURING CO.

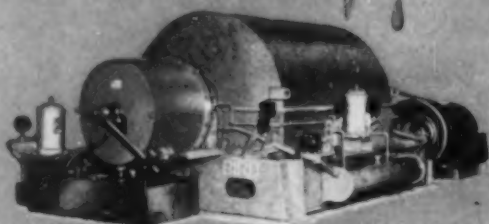
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*sales offices and distributors
in principal cities*

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA.

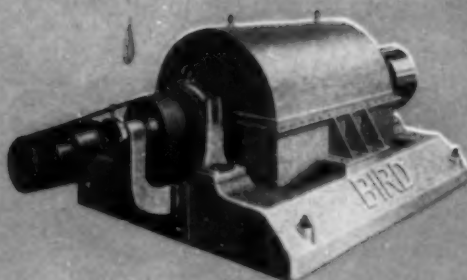


After You've Washed Your Fine Coal



This is the BIRD to dry it

The Bird Coal Filter does the complete dewatering job — no auxiliary equipment. It handles a ton of dried coal a minute — runs day in and day out, with maintenance shutdowns scheduled after months of continuous operation not days or shifts. Cost of operation and maintenance is less than seven cents per ton. The discharged coal contains less than seven percent water and is free of moisture bearing high ash slimes which are handled by the Polisher.



This is the BIRD to polish up the cleaning water

The Bird Polisher and a simple, low cost flocculation system takes out the solids and delivers them to a refuse bell. Only gin clear water goes back to the washer for reuse. No sludge pond nuisance. No pollution headaches. If more water enters the system than is removed with the coal or refuse you can bleed clear water.

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS



1954 Annual Index

THIS YEAR'S ANNUAL INDEX you'll find beginning on p 175 of this issue is included as a regular *Coal Age* service to readers. Classified for easy reference in three ways, by subject, by coal company and by author, are the mine-descriptive articles and shorts, special studies, comprehensive reports, meeting write-ups and other editorial material that appeared in the 12 *Coal Age* issues of 1954, including this December number.

For readers seeking to make the most use of *Coal Age*, we suggest that you keep the Index available. Naturally, you won't find the answer to every problem that arises, but as your file of yearly indexes grows, you will discover that you have acquired a working bibliography of modern mining practice that is available in no other place. Incidentally, if any time you are looking for a specific article previously published, we will be glad to send you a tearsheet without charge as long as our supply lasts.

By the way, what this index represents is worth noting, we think. First, of course, is the some 860 pages of editorial material to be found in the 12 issues, considerably more, incidentally, than that published by any other coal mining magazine. It also summarizes more than 75,000 miles of travel of *Coal Age* editors during the past year—visits to mines, attendance at all significant industry conventions and talks with hundreds of mining men and manufacturers.

In addition, it pinpoints several hundreds of "Idea Opportunities" *Coal Age* has offered during the year—practical ideas, "first reports" of significant new mining developments, comprehensive analyses of industry problems and trends and the combined experience of many other mining men, most of which is yet to be available in other printed form.

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EASY STARTS —TOUGH PROTECTION

TEXACO OLYMPIAN GREASE assures that mine cars will start smoothly and easily even at mid-winter temperatures. In fact, you'll enjoy maximum efficiency and lower maintenance costs throughout the year with this tough, long-lasting lubricant that barricades wheel bearings against dirt, moisture and wear.

Texaco Olympian Grease is available in three consistencies to meet all needs of plain, cavity hub or anti-friction bearings. It shows outstanding resistance to oxidation, will not separate in service or storage. Use *Texaco Olympian Grease* for low-cost performance and longer bearing life.

To protect high-speed, grease-lubricated ball and roller bearings, use *Texaco Regal Starfak*. This premium-quality lubricant stays in the bearings, protects against wear and rust, assures reduced upkeep costs.

A Texaco Lubrication Engineer can help you cut costs and raise efficiency. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TUNE IN:

TEXACO STAR THEATER
starring JIMMY DURANTE
or DONALD O'CONNOR,
on TV Saturday nights.
METROPOLITAN OPERA
radio broadcasts
Saturday afternoons.



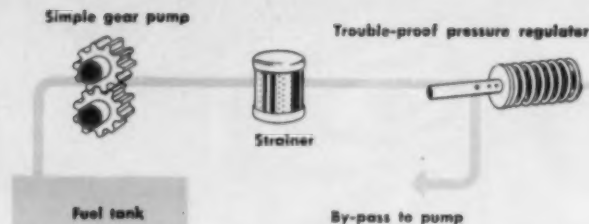
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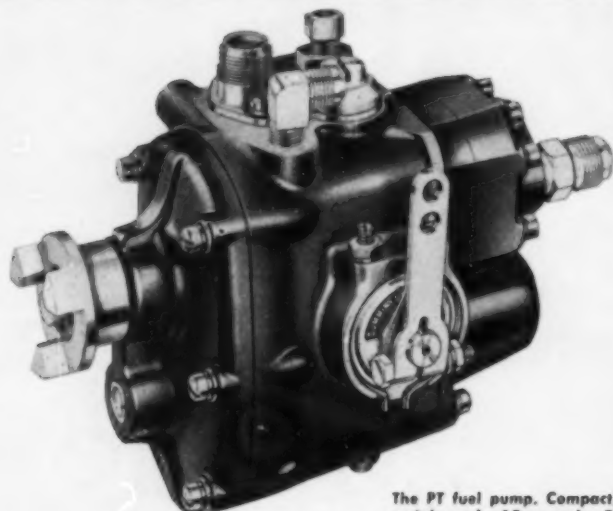
LUBRICANTS for the Coal Mining Industry

Here's the simplest diesel fuel system ever developed!

Simplest pump and fuel control arrangement



Cummins new **PT** fuel system... ..



The PT fuel pump. Compact, easy to handle, weighs only 13 pounds. Does not have to be timed to engine, quick and easy to install.



The PT injector utilizes the exclusive Cummins principle of fuel injection which has set the highest standards of performance and economy for more than 20 years.

THE revolutionary new PT fuel system, now standard on all Cummins Diesels, has fewer and far simpler parts than carburetor and ignition systems or ordinary diesel fuel systems. It is easy to understand, simple to work with, can be serviced by any mechanic. No longer any need for fuel system specialists! The PT fuel system has under-

gone two years of field testing and millions of operating miles under every conceivable condition. Its dependability record is phenomenal. Operators report even less fuel consumption than with earlier Cummins fuel systems and far less cost of maintenance. The PT fuel system can be installed on any Cummins Diesel built since 1932.

Cummins

leader in lightweight high speed diesel power

Cummins Diesels (60 to 600 h.p.) are built for and used by original equipment manufacturers in highway trucks, off-highway trucks, power shovels, scraper units, buses, motor graders, logging yarders and loaders, oil well drilling rigs, electric power generators, irrigation systems, work boats, and pleasure craft.



Throttle



Flyball governor



Solenoid shut-down

Injector



Return to fuel tank

PT advantages over gasoline systems:

- | | |
|-----------------------------|----------------------------|
| No contact points to adjust | No vapor-lock problems |
| No condenser to replace | No flooding |
| No spark coil to short | No choking or priming |
| No wiring harness to short | No needle valves to clog |
| No spark plugs | No butterfly valve |
| | No float level to maintain |
| | No float valve to stick |

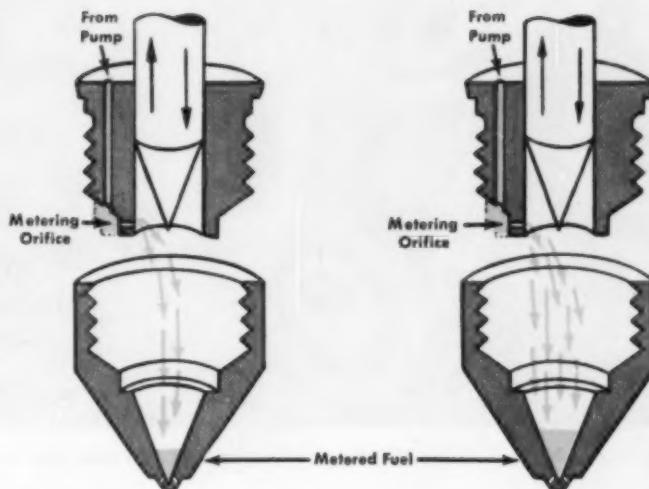
PT advantages over ordinary diesel systems:

- | | |
|--------------------------|-----------------------------|
| No fuel rack adjustments | No distributor discs |
| No check valves | No metering pumps |
| No needle valves | No high-pressure fuel lines |
| No helixes | No fuel pump timing |

... simpler to work with than gasoline carburetion and ignition

Simplest Fuel Metering Device

The principle is simply that the amount of fuel flowing through a fixed orifice varies according to the amount of pressure on the fuel. Pressure is controlled by the throttle on the PT pump. Fuel flow through orifice is cut off as injector plunger, actuated by engine camshaft, moves down to inject fuel.



When engine is under partial load, fuel pressure is low, and only a small amount of fuel passes through orifice into injector cup.

When engine is under full load, fuel pressure is increased, and greater amount of fuel passes through orifice into injector cup.

Mail this today, and get more PT facts!

CUMMINS

CUMMINS ENGINE COMPANY, INC. DEPT. CA-12
Columbus, Indiana

Please send me free illustrated folder, "Cummins PT Fuel System."

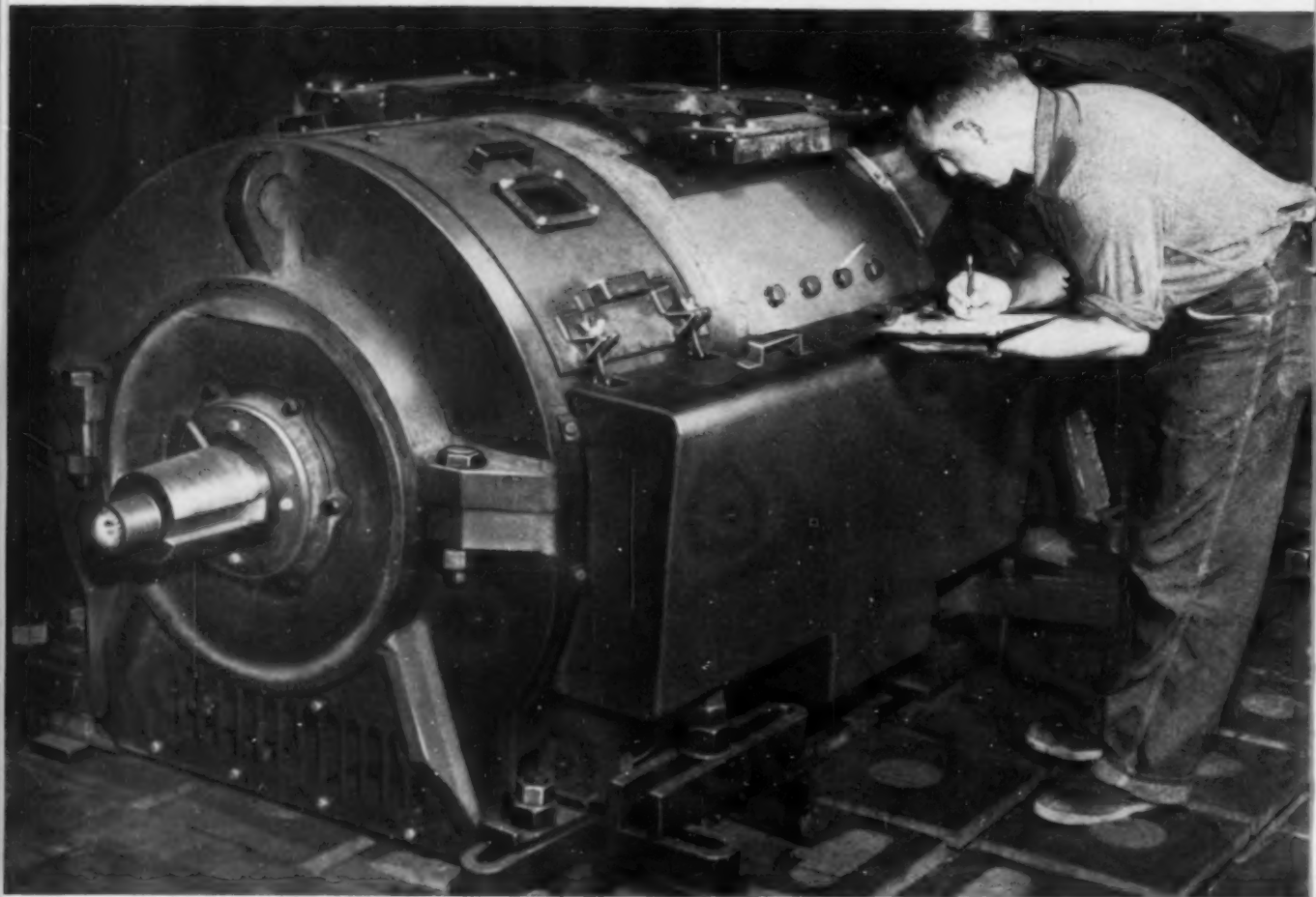
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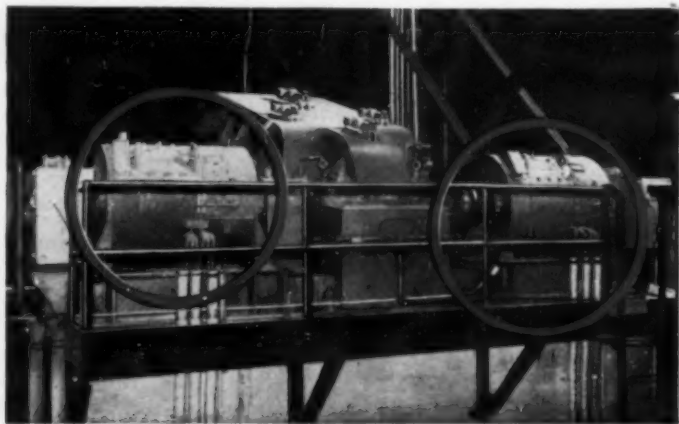
NEW G-E Armored Mill Motor—



TO ASSURE YOU of dependable service, this MD-622 is undergoing the rigid tests given to all G-E Armored Motors before shipment.



POWER SHOVEL equipped with compact G-E Type MD motors which have high overload capacity and the ability to take the terrific shocks of excavating duty.



SLAB SHEAR in reversing, blooming and slabbing mill is typical of severe applications in the steel industry that are dependably powered by G-E armored motors.

Most Powerful in its Class

Another G-E "first"—the MD-622—gives you more horsepower and torque than any other mill motor!

POWER-PLUS for the toughest heavy-duty application—that's the job of the MD-622—General Electric's latest addition to the MD-600 Armored Motor line.

AISE OBJECTIVES set up for smaller motors of this type, are met in the construction of the MD-622, which gives you more horsepower, increased commutating ability and better speed regulation in the same mounting dimensions as the earlier motor. Designed for duty in steel mills, power shovels, mine operations, dredges and ore bridges, it's ideal for extra torque, high momentary loads and snappy reversals.

RATED 500 HP AT 350 RPM when force ventilated, this motor delivers more torque relative to its size than any other mill motor ever built.

BETTER SPEED REGULATION can be maintained at higher speeds than in previous motors—and maximum safe speed is 20% higher.

WIDER SPEED RANGE is possible with the adjustable speed MD-622 and stabilizing series windings are not required, simplifying control on reversing operations.

REDUCED MAINTENANCE due to integral feet on

armature. Out of frame, it stands by itself. Armature spider allows replacement of shaft without disturbing windings.

FOR NEW BULLETIN on MD-600 motors, fill out the coupon below. If you need more information, contact your nearest G-E Apparatus Sales Office. General Electric Co., Schenectady 5, N. Y.



Please send Bulletin GEA-4654C, "DC Armored Motors," which gives the complete story on the MD-600 line with examples of their reliable performance throughout industry.

General Electric Co.
Section M810-3
Schenectady, N. Y.

☐ Planning an immediate project.
☐ For reference only.

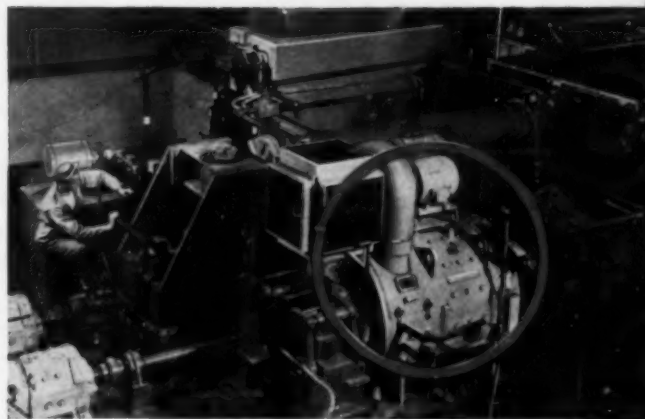
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Progress Is Our Most Important Product

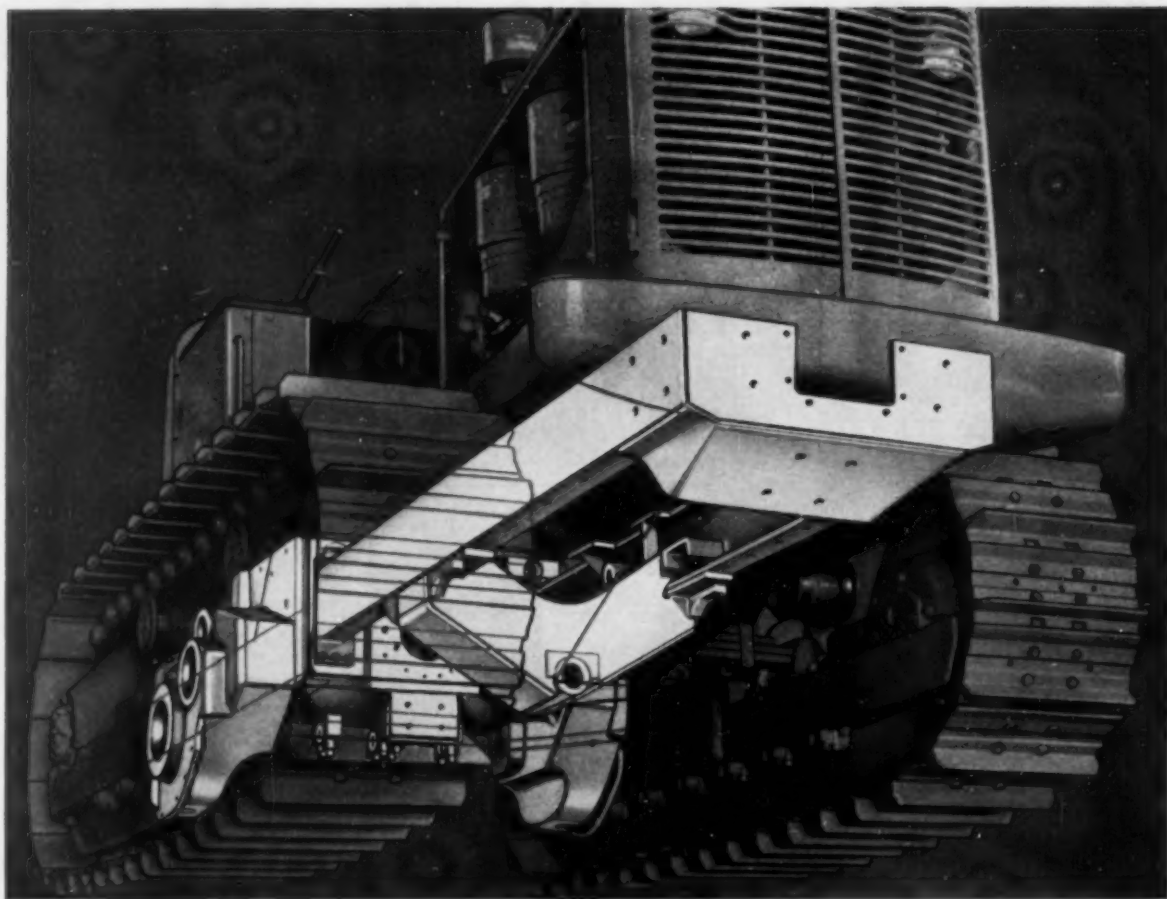
GENERAL  ELECTRIC



DRAGLINE powered by amplidyne-controlled G-E armored motors—which were selected because of their high torque and quick reversing characteristics.



COILER in hot strip mill driven by force ventilated G-E armored motor with extra horsepower and mechanical strength to withstand severe operating conditions.



HOW THE MAIN FRAME CONTRIBUTES TO TOP TRACTOR PERFORMANCE

One of the big reasons why more and more Allis-Chalmers tractors are being used today is their exclusive main frame design.

These frames are one-piece, all-steel welded structural members (like the girders in a bridge or the columns in a building). They help provide greater strength and flexibility to withstand shock loads . . . make possible better equipment mounting, improved weight distribution and outstanding service simplicity as well.

We invite you to see these advantages . . . first at your nearby Allis-Chalmers dealer . . . and then in a demonstration.

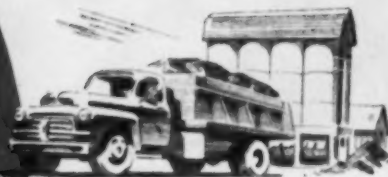
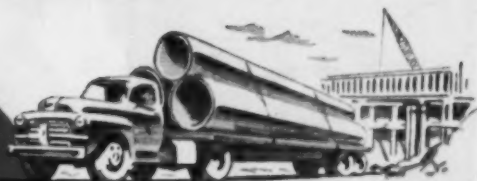
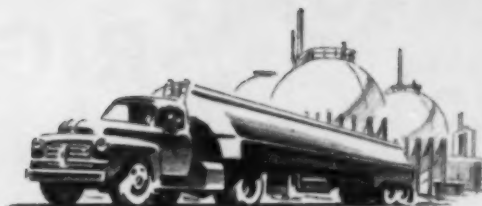
"ROLLS WITH THE PUNCH" — All-steel main frame flexes slightly under extreme shock loads . . . without transmitting strain to engine, clutch or transmission.

BETTER EQUIPMENT MOUNTING — This frame's compactness provides ample clearance for equipment like front-end shovels . . . permits wide track shoes . . . improves performance of entire unit.

IMPROVED WEIGHT DISTRIBUTION — Box A-frame allows location of main components for best over-all balance . . . putting more weight lower in tractor where it does the most good.

SERVICE SIMPLICITY — Since main frame carries structural load, power drive components can be readily removed, repaired or replaced without disturbing adjacent parts.

ALLIS-CHALMERS
TRACTOR DIVISION—MILWAUKEE 1, U.S.A.



Eaton 2-Speed Axles are Cutting Costs in Every Field of Heavy Duty Hauling



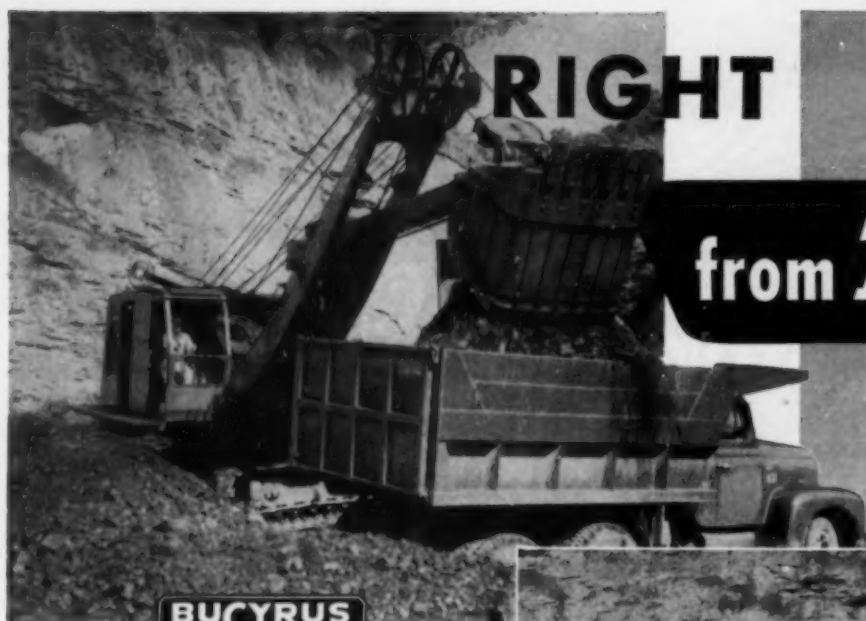
More than Two Million
Eaton Axles in Trucks Today!
Ask your truck dealer for complete information.

EATON

AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO



PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



**BUCYRUS
ERIE**

Bucyrus-Erie excavators produce high output through individual design. Each model in the line is built to handle a definite size payload, so that maximum stability and strength are obtained without the extra weight that slows down the operating cycle. Power flows smoothly through simple, efficient main machinery without excessive loads on moving parts . . . without punishing demands on the engine.

The result?

FAST, SMOOTH OPERATION —

Digging, swinging, and dumping motions blend smoothly because all factors . . . power, speed, weight, and strength are carefully balanced.

LONG-TERM DEPENDABILITY —

Inside and out Bucyrus-Eries last longer. Each part of the machine is just right to carry its share of the load and deliver long service life.

For the full story on what "individual design" means in big output and long machine life, see your nearby Bucyrus-Erie distributor.

46E54

RIGHT

from **TEETH**



to **TREADS**

3/8- to 4-cu. yd. gasoline, diesel, and single-motor electric shovels, draglines, cranes, and clamshells. Dragsbovels from 3/8- to 2 1/2-cu. yd.

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin



EDISON SELF-SERVICE

SETS THE PACE . . .

For many years, in major mining areas all over the nation, Edison Self-Service has answered the need for fast, economical lamp distribution. The simplicity of the Edison Self-Service System eliminates "bottlenecks" in the lamproom during shift changes . . . miners move in and out with the greatest possible speed.

You can profit from our long experience in Edison Self-Service. Just write or call.



When you have a safety problem, M.S.A. is at your service
... our job is to help you

MINE SAFETY APPLIANCES COMPANY

201 North Braddock Avenue, Pittsburgh 8, Pa.

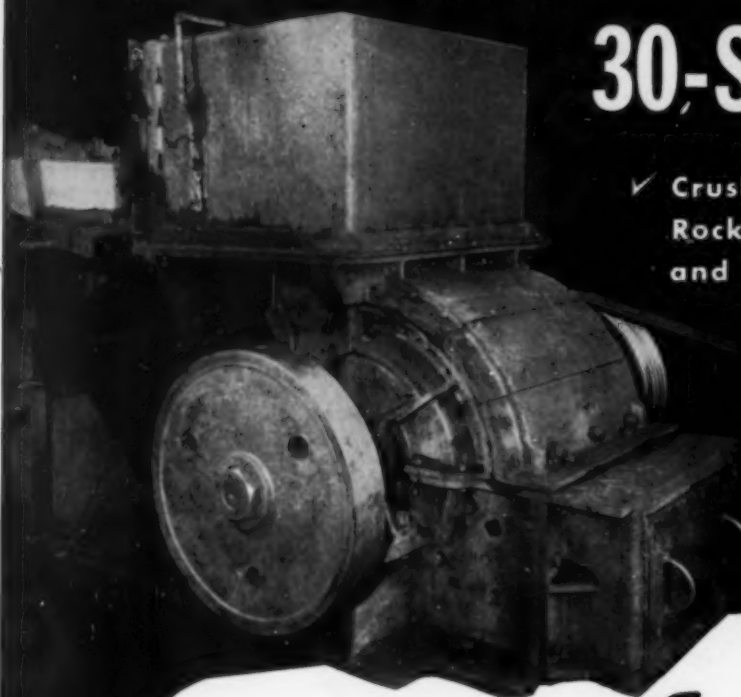
At Your Service:

77 Branch Offices in the United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA, LTD.

Toronto, Montreal, Calgary, Edmonton, Winnipeg,
Vancouver, Sydney, N.S.

NEW *American* HEAVY-DUTY 30-S CRUSHER



✓ Crushes ROM Coal
Rock, Slate, Sulphur Balls,
and Gob... without oversize

✓ Saves Labor Costs
of Pickers

✓ Saves Coal

THE HEAVY-DUTY *American* PAYS OFF FOR THESE 3 MINES:

- **CRESCENT COAL CO., Central City, Ky.** "We have not spent a cent on this crusher since installation," writes the General Manager. It has eliminated two pickers . . . recovers coal previously thrown away on account of impurities. By crushing and washing, this coal is salvaged. Estimated average of 280 tons of coal and "gob" go through crusher every day. "In 18 years' experience with American Crushers, we know it is the most economical and ideal crusher for our operation."
- **PERRY COAL CO., O'Fallon, Ill.** Previous crusher required three men at the picking table, according to the Mine Superintendent. Today, only one operator is needed to remove wood and tramp metal. No replacement parts have been needed . . . recent inspection showed no signs of wear after 16 months' operation at a daily operation of 210 tons for 7" plus ROM coal. This Heavy-Duty American is one of five Americans installed at this mine.
- **SOUTHWESTERN ILLINOIS COAL CO., Percy, Ill.** "The Mine reports that the installation of the American Pulverizer #30-S crusher has been an excellent labor-saving device. In the 12 months of operation the crusher has had no parts replacements. Continued inspection and past American Crusher history indicate the maintenance of this crusher will be a very small item. Approximately 320 tons of coal per day go through this crusher."

● Let American show you how you can profit by a 30-S Heavy-Duty installation. We welcome your inquiries.

American
Originators and Manufacturers of
Ring Crushers and Pulverizers

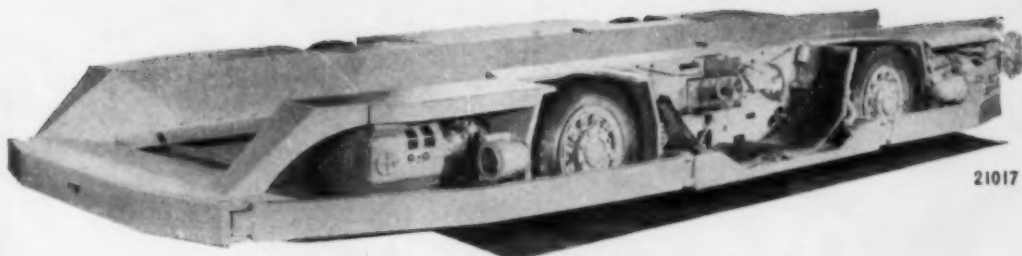
PULVERIZER COMPANY

1119 Macklind Ave.,
Saint Louis 10, Mo.

BIG CAR STRENGTH

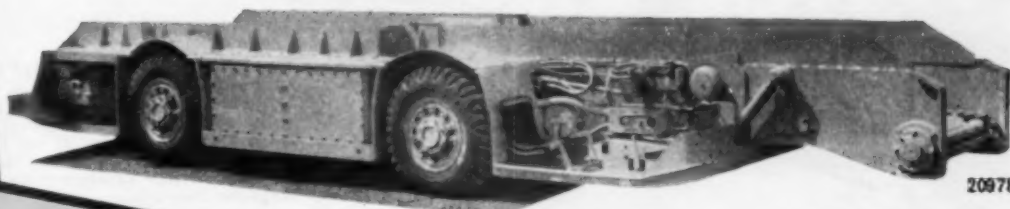
in these

Goodman shuttle cars for low coal



21017

TYPE 870 • BASIC HEIGHT 26" • ADJUSTABLE DISCHARGE



20978

TYPE 670 • BASIC HEIGHT 32" • ADJUSTABLE DISCHARGE

These are tough little cars that have all of the rugged strength of the big Goodman shuttle cars. Many of their parts are similar and even interchangeable with those on the big cars.

They have more than adequate horsepower for quicktrip transfer of heavy loads; high capacity is available to handle surge loads.

Both the type 870 and type 670, of course, offer such standard Goodman features as 4-wheel drive, 4-wheel steering, 4-wheel brakes, hydraulic controlled cable reel, one- or two-speed conveyor chains, dual control in operator's cab, U. S. Bureau of Mines approval.

These cars are fully described in Catalog 5411. Let us send you a copy.

Goodman
MANUFACTURING COMPANY

Halsted Street and 48th Place • Chicago 9, Illinois

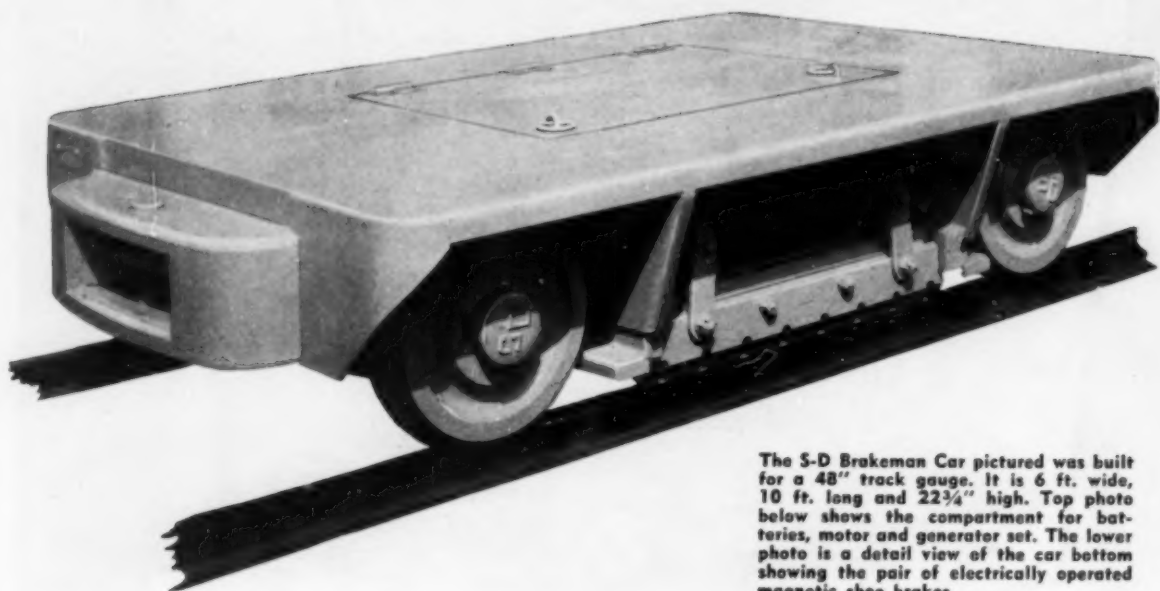
OTHER CABLE REEL CARS IN THE COMPLETE GOODMAN LINE:

- Type 580, basic height 42", adjustable discharge
- Type 582, basic height 42", fixed discharge
- Type 570, basic height 48", adjustable discharge

Cutting Machines • Conveyors • Loaders • Shuttle Cars • Locomotives • Continuous Miners

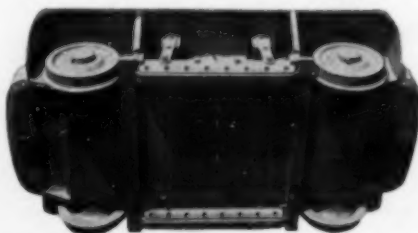
SANFORD-DAY ANNOUNCES THE S-D BRAKEMAN CAR

**Now you can eliminate skids
and additional locomotives
for breaking trips downgrade!**



The S-D Brakeman Car pictured was built for a 48" track gauge. It is 6 ft. wide, 10 ft. long and 22 3/4" high. Top photo below shows the compartment for batteries, motor and generator set. The lower photo is a detail view of the car bottom showing the pair of electrically operated magnetic shoe brakes.

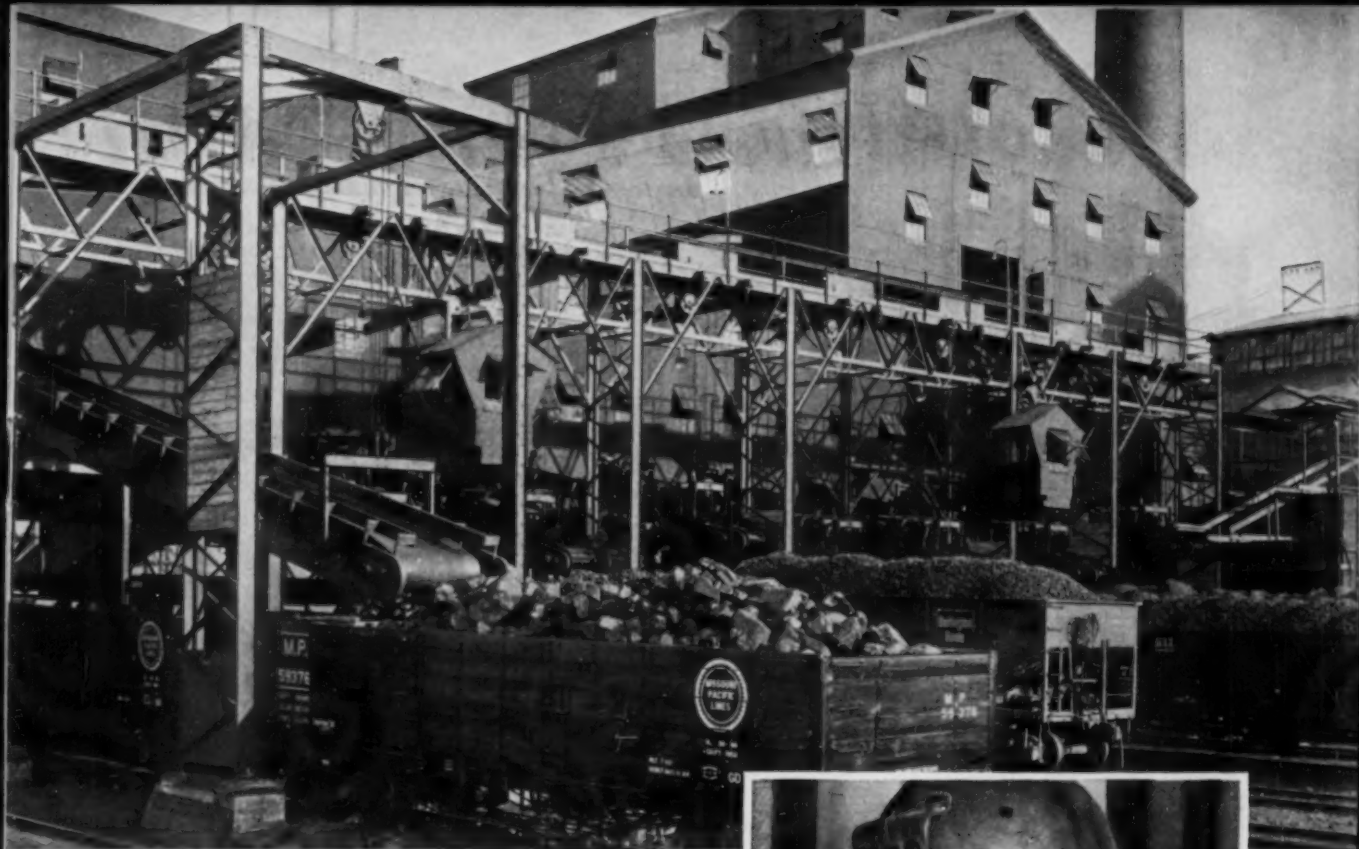
YOU NEED NO LONGER resort to skids or costly locomotives for extra braking power. We have developed a special car for braking that incorporates electrically operated magnetic shoe brakes. The S-D Brakeman Car pictured here was built for Pond Creek Pocahontas Co. to replace a locomotive used in trips for braking. The "Brakeman Car" is built to meet your particular requirements. It may be used between locomotives . . . between locomotive and cars . . . between cars or at end of a trip. Controls for the shoe brakes can be provided at the locomotive operator's fingertips, regardless where the Brakeman car is located in the train. Ask us to supply you with complete information. *Sanford-Day Iron Works, P. O. Box 1511 . . . Telephone 3-4191, Knoxville, Tenn.*



Sanford-Day
IRON WORKS
KNOXVILLE • TENNESSEE

AND
BROWN-FAYRO
DIVISION

MINI CARS, All Types - PRECISION
WHEELS - "Brownie" MOUNTS
CAR RETARDERS - SPOTTERS
PUMPS - OIL SPRAY SYSTEMS



"Mine problem...my problem"

says Standard lubrication specialist

● The large midwest mine whose preparation plant is pictured above is just one of the many satisfied Standard Oil mine customers throughout the Midwest. In addition to experienced Standard lubrication specialists always ready to give valuable help wherever and whenever it's needed, Standard provides the Midwest's most dependable source for quality greases and lubricants. For every mine lubrication purpose—Standard products prove superior in actual use!

In the mine pictured above, the following products have had a successful job history:

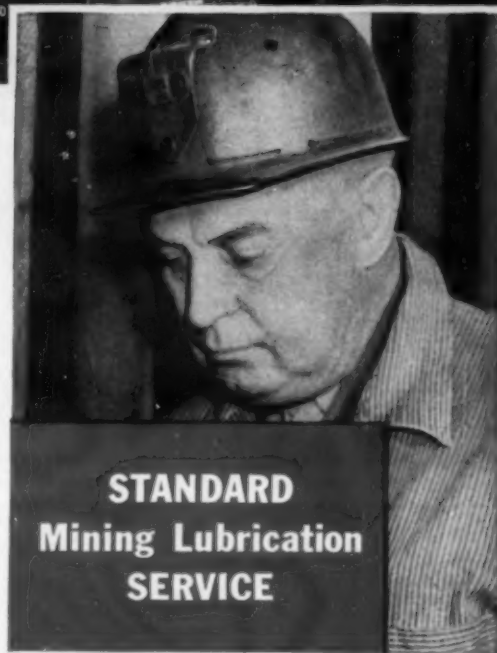
SUPERLA Mine Lubricant No. 00—used in gear cases and hydraulic units of the mine loaders. Result: no clutch or bearing failures; clean, carbon-free clutch plates; no downtime for maintenance on hydraulic units.

SUPERLA Mine Lubricant No. 4—used in the loader gathering heads. Result: despite terrific shock loads, wear has been kept to a minimum.

STANOIL Industrial Oil—used in the speed reducers in the tippie. Result: trouble-free, smooth operation keeps costly maintenance time down to a minimum.

STANOLITH Grease—used throughout the tippie on grease fittings and on conveyor belt idler bearings. Result: better protection; grease consumption reduced; grease application time cut 50%.

Why don't you put Standard quality and Standard versatility to work for you today?



Standard Oil lubrication specialist, Herve Dillingham, helped this midwest mine with its lubrication program. The Standard Oil lubrication specialist near you can help you get good results on your lubrication problems. Call your nearest Standard Oil office. Or write, the Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY



(Indiana)

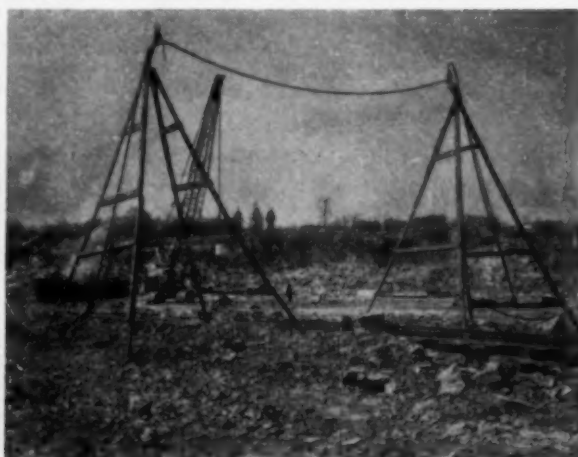
"Our *Tiger Brand*



NOTICE THE CABLE TRAY fastened to the shovel. This was developed by Universal Atlas for easier cable handling.



TWO WORKMAN WATCH from blast shelter as charge is set off in distance. Low horses cushion cable from shock of falling rock.



HERE A CABLE is raised on horses to clear the railroad track. It feeds the shovel visible in background.

Amerclad lasted 12 years"

Says Chief Electrician, Hudson Plant Universal Atlas Cement Company

Year after year, at this quarry, the Amerclad is exposed to knife-sharp fragments of flying rock. During the summer, the rock often gets so hot that you can't even touch it. Other times, the cable lies out in the rain and snow—often at sub-zero temperatures.

At the Hudson, N. Y. quarry of Universal Atlas, Chief Electrician Frank Rodmond said, "This Amerclad runs the constant danger of being hit with flying rock fragments through secondary blasting. Yet the down-time cost of this operation is so high that we just can't stand cables that keep failing. We kept that last batch of Amerclad 12 years before we replaced it, yet it was still serviceable when we switched over to new Amerclad."

If you want service like this, specify Amerclad the next time you need cable that can really take it. Amerclad is available in a great many sizes and constructions, with or without shielding. There is a type to power anything from a river dredge or mine locomotive down to a rough and tumble electric hand drill. *Send the coupon*, and get more information.

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL CORPORATION
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK



THIS IS A TYPICAL DRILL. It uses a 4-conductor No. 8 Amerclad cable.



A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB!

paper & varnished cambric cable	mold cured portable cord
asbestos wire and cable	machine tool & building wire
aerial, underground & submarine cable	special purpose wire & cable
shovel & dredge cable	

SEND THE COUPON

American Steel & Wire Division
Room FE-124, Rockefeller Building
Cleveland 13, Ohio

- ☐ Please give me more information about Amerclad.
☐ I'd like to talk to your representative.

Name

Firm

Address

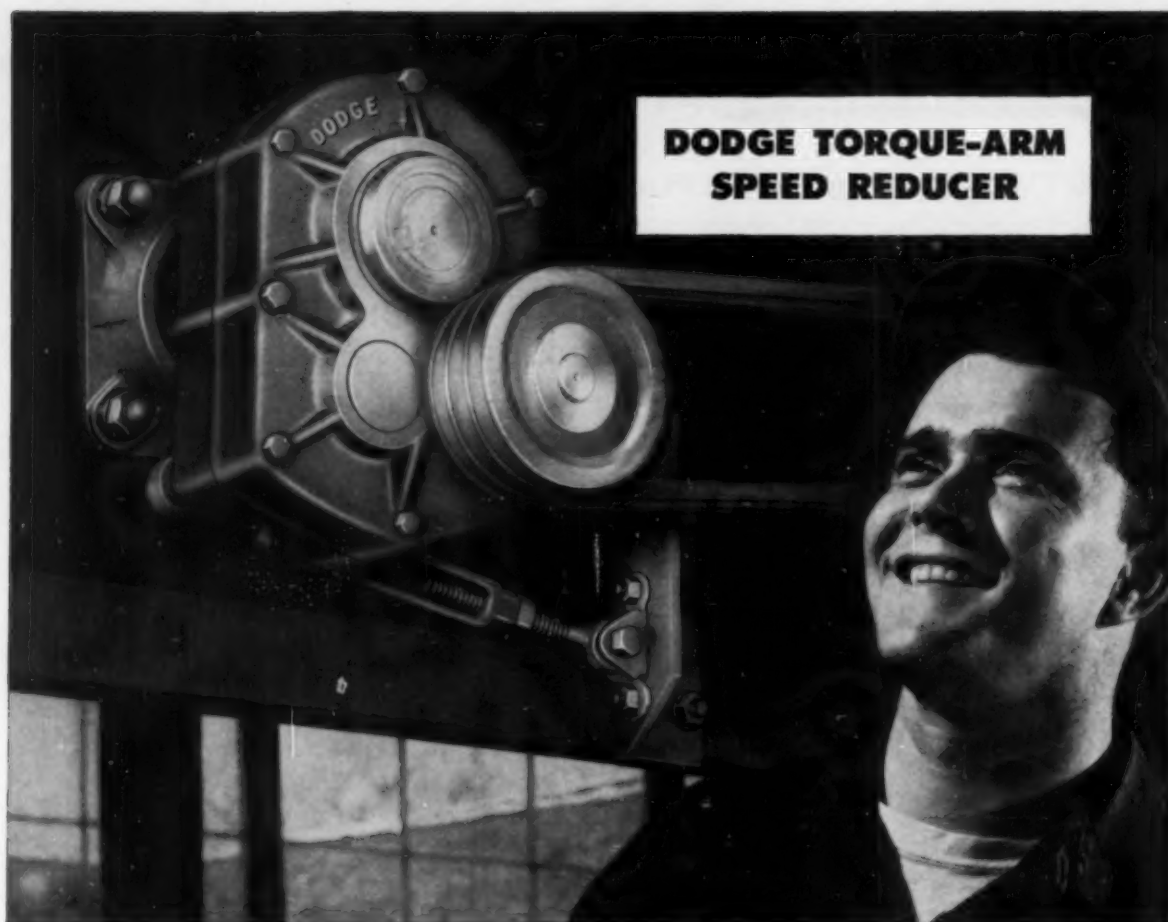
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U-S-S Tiger Brand

ELECTRICAL WIRE & CABLE



UNITED STATES STEEL



DODGE TORQUE-ARM SPEED REDUCER

Costs less - Delivers more!

Savings up to 33% . . . efficiency up to 97% . . . are yours with this new and better kind of speed reducer. Proved in tens of thousands of installations, in all types of industry!

This reducer is mounted directly on the driven shaft. No foundation, no flexible couplings, no sliding base required. No lining up difficulties. The torque-arm, fastened to any fixed object, anchors the reducer. Unit is driven through any V-belt drive. Stock Taper-Lock Sheaves prescribed for each job. Tri-Matic Overload Release and Backstop are available if desired.

Torque-Arm Speed Reducers are sold from

Distributor's stocks—in single reduction and double reduction series—with capacities from 1 to 43 hp and output speeds from 12 to 330 rpm. Standardize on this modern idea in speed reduction—it saves you money.

DODGE MANUFACTURING CORPORATION, 3000 Union St., Mishawaka, Ind.

DODGE

→ of Mishawaka, Ind.



TAPER-LOCK SPROCKETS
AND DODGE ROLLER CHAIN



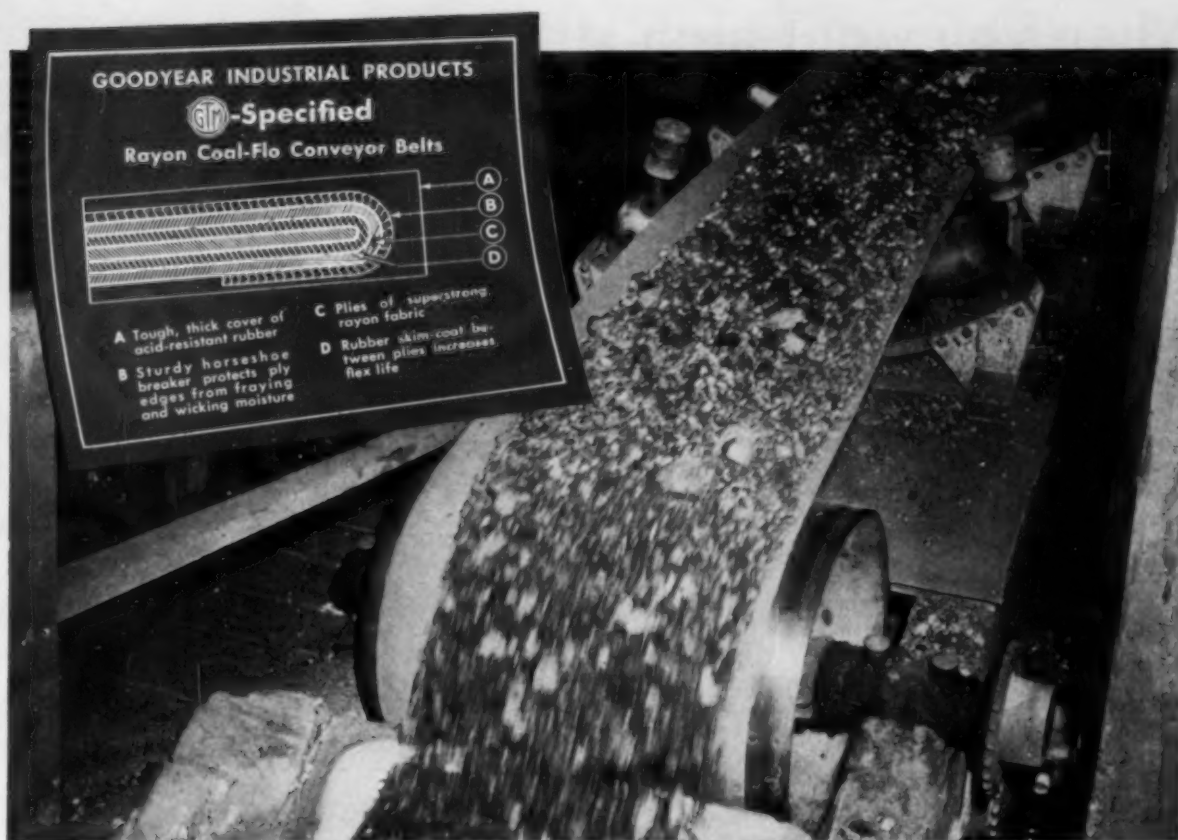
TAPER-LOCK SHEAVES



DODGE-TIMKEN
PILLOW BLOCKS

Call the Transmissioneer, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.





Coal-Flo—T. W. The Goodyear Tire & Rubber Company, Akron, Ohio

WHY RAYON

in COAL-FLO CONVEYOR belting?

BALANCED construction. Troughability superior to belts with 25% less tensile strength. 20%-60% greater fastener-holding ability. Up to 50% less stretch. 30% less thickness. 37% less weight. Higher tear resistance. These are the reasons why COAL-FLO conveyor belts are built with rayon.

The rayon duck used in COAL-FLO belting is custom woven. Lengthwise and transverse cord strength is

properly balanced. This eliminates variable stretch and strength characteristics that result in uneven tension distribution and accelerated fatigue. And the belt is thinner, stronger, lighter in weight for better flexing, less take-up and tearing, more pay load.

All this adds up to a longer haul at lower cost. Especially since the belt is thoroughly protected by an exclusive mildew inhibitor developed by

the G.T.M.—Goodyear Technical Man—and fully proved in over 25 years' use. More details? Contact your Goodyear Distributor, the G.T.M. or Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR

can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."

GOOD YEAR

THE GREATEST NAME IN RUBBER

We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

When you want high strength in your mining equipment start with a high strength steel

USS TRI-TEN STEEL gives you high strength plus high resistance to impact at low temperatures. This tough, versatile steel is ideal for use in heavy-duty equipment which must operate in sub-zero weather. For it retains its toughness and withstands shock under low temperature conditions. Will keep your shovels, draglines and dozers going when others fail.

USS COR-TEN STEEL gives you high strength plus high resistance to corrosion. This high strength steel has 4 to 6 times the resistance to atmospheric corrosion of ordinary structural steel, and 2 to 3 times that of copper steel. This property helps to assure long life and low maintenance cost in mine cars and similar equipment subject to atmospheric corrosion.

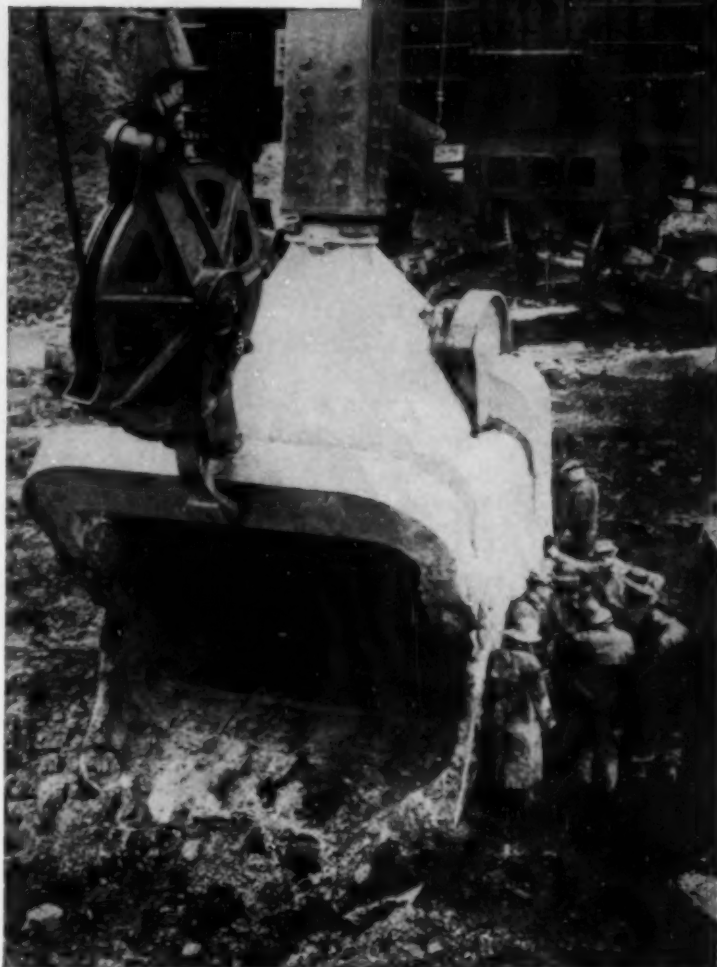
USS MAN-TEN STEEL gives you high strength plus resistance to abrasion. This lower-cost grade has a higher resistance to abrasion than ordinary carbon steel. In addition to high strength and toughness, it has workability and weldability to a higher degree than obtainable in carbon steel at the same strength level.

• • •

• Used singly or in combination, these USS High Strength Steels will give your equipment the strength and stamina to work faster and last longer—to boost production, to cut repair costs. For all these famous steels have a 50% higher yield point, and greater resistance to wear, impact, abrasion and fatigue than ordinary carbon steel.

You can use any of these USS High Strength Steels in the same thickness as carbon steel to increase the strength and durability of equipment, without increasing its weight. Or, by substituting these steels in thinner sections for carbon steel, you can reduce the weight of the equipment without reducing its strength. Or, on certain applications, you can increase the size and capacity of equipment without increasing its weight.

For more information or application data concerning USS High Strength Steels, call or write our nearest office.



NEW BOOK GIVES COMPLETE STORY OF USS COR-TEN STEEL

Just off the press, this 58 page book is crammed with factual data about USS Cor-Ten Steel. Contains list of mechanical properties and characteristics, shows savings that can be affected through its use. Send for your free copy today.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS HIGH STRENGTH STEELS



4-1028

UNITED STATES STEEL



▲ In its pre-sizing operation, Olga uses nine Ripl-Flo screens.

Six Low-Head screens are used in the sink-float process. ►



ALLIS-CHALMERS *helps* OLGA Modernize

The new preparation plant of the Olga Coal Company is one of the largest and most modern plants in its field. In it are utilized the latest production methods and equipment. These advanced procedures and machines are designed and coordinated to upgrade coal, increase capacity and cut operating costs.

Like many other industry leaders, Olga Coal Company has in use a number of Allis-Chalmers vibrating screens. By coming to Allis-Chalmers, it was possible for Olga (through its engineering consultants) to specify from the broadest range

of screen types and sizes in matching the screen to their particular job.

Today, more Allis-Chalmers screens are used in coal preparation plants than any other make. This pronounced preference reflects industry-wide recognition of the overall superiority of A-C screens and the importance of right-for-the-job integration.

It will pay you to see the new selection guide, Bulletin 25C6280E. Get it from your A-C representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4496

Ripl-Flo and Low-Head are Allis-Chalmers trademarks.

ALLIS-CHALMERS



Immediate local delivery of



**Fast local
delivery
saves you
time and
money!**

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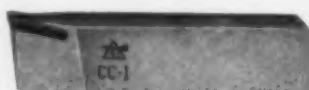
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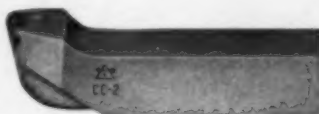
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**CC-1
Medium-Duty Bit**

SPECIFICATIONS			
Order No.	Width	Height	Length
CC-1	1/2"	1"	4"



**CC-2
Heavy-Duty Bit**

SPECIFICATIONS			
Order No.	Width	Height	Length
CC-2	1/2"	1"	4"



**CCS-2
Heavy-Duty Bit with Stop**

SPECIFICATIONS				
Order No.	Width	Height	Length	Stop
CCS-2	1/2"	1"	4"	1 1/4"



CC-3 Extra Heavy-Duty Bit

SPECIFICATIONS				
Order No.	Width	Height	Length	Stop
CC-3	1/2"	1"	3 3/4"	1 1/4"



CC-4 Ripper Head Bit

SPECIFICATIONS			
Order No.	Width	Height	Length
CC-4	1/2"	1 1/2"	5 1/4"



Finger Bit

SPECIFICATIONS			
Order No.	Width	Height	Length
FB-B-3	1/2"	1/2"	2 1/4"
FB-B-5	1/2"	1/2"	3"

CARBOLOY Department of General Electric Company
11120 E. 8 Mile Street, Detroit 32, Michigan

Please send my free copy of:

- ☐ New Carboloy Mining Tool Catalog CM-120
☐ New Maintenance Instruction Manual, CM-121

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and New Maintenance Manual**

New Carboloy Mining Tool Catalog contains complete information, specifications and prices on new, complete line of Carboloy tools. New Maintenance Manual shows you latest maintenance techniques on all carbide mining tools. Send coupon, today, for your free copies.

full Carboloy[®] mining tool line cuts inventories and per ton costs

One source—your local Authorized Carboloy Mining Tool Distributor—can handle all your requirements immediately, right from stock

Your local Authorized Carboloy Mining Tool Distributor has the correct tool immediately available to answer your every mining tool need. "Quick off-the-shelf" delivery means you don't have to carry a costly tool inventory.

Carboloy carbide mining tools are mine-tested, mine-designed and mine-proved by the oldest American carbide manufacturer; their use substantially reduces costs per ton.

During the last 26 years, the Carboloy organization has put painstaking research, skillful engineering and rigid production standards into the manufacture of carbide tools. This experience results in less tool breakage, longer tool life—under any operating conditions. Check your requirements against the tools listed here. Then, place your order with the nearest Authorized Carboloy Mining Tool Distributor, listed at left.



Square-Shank Auger Drill

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
AD-1½	1½"	3"	½"
AD-1¾	1¾"	3"	½"
AD-1½	1½"	3½"	½"
AD-1¾	1¾"	3½"	½"
AD-2	2"	3½"	½"
AD-2½ S	2½"	3½"	½"



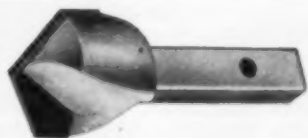
Hex-Shank Auger Drill

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
AD-2½ H	2½"	4½"	1½"
AD-2½	2½"	4½"	1½"
AD-2½	2½"	4½"	1½"
AD-3	3"	5½"	1½"



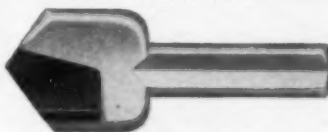
V-Prong Auger Drill

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
ADN-1½	1½"	3½"	½" sq.
ADN-1 ½	1 ½"	3½"	½" sq.
ADN-2	2"	3½"	½" sq.



Roof-Bolting Drill, Solid Type

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
PT-1¾	1¾"	2½"	¾"
PT-1½	1½"	2½"	¾"



**Roof-Bolting Drill
Solid Type with Waterway**

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
PTH-1¾	1¾"	2½"	¾"
PTH-1½	1½"	2½"	¾"
PTH-1½	1½"	2½"	¾"



Roof-Bolting Drill, Prong Type

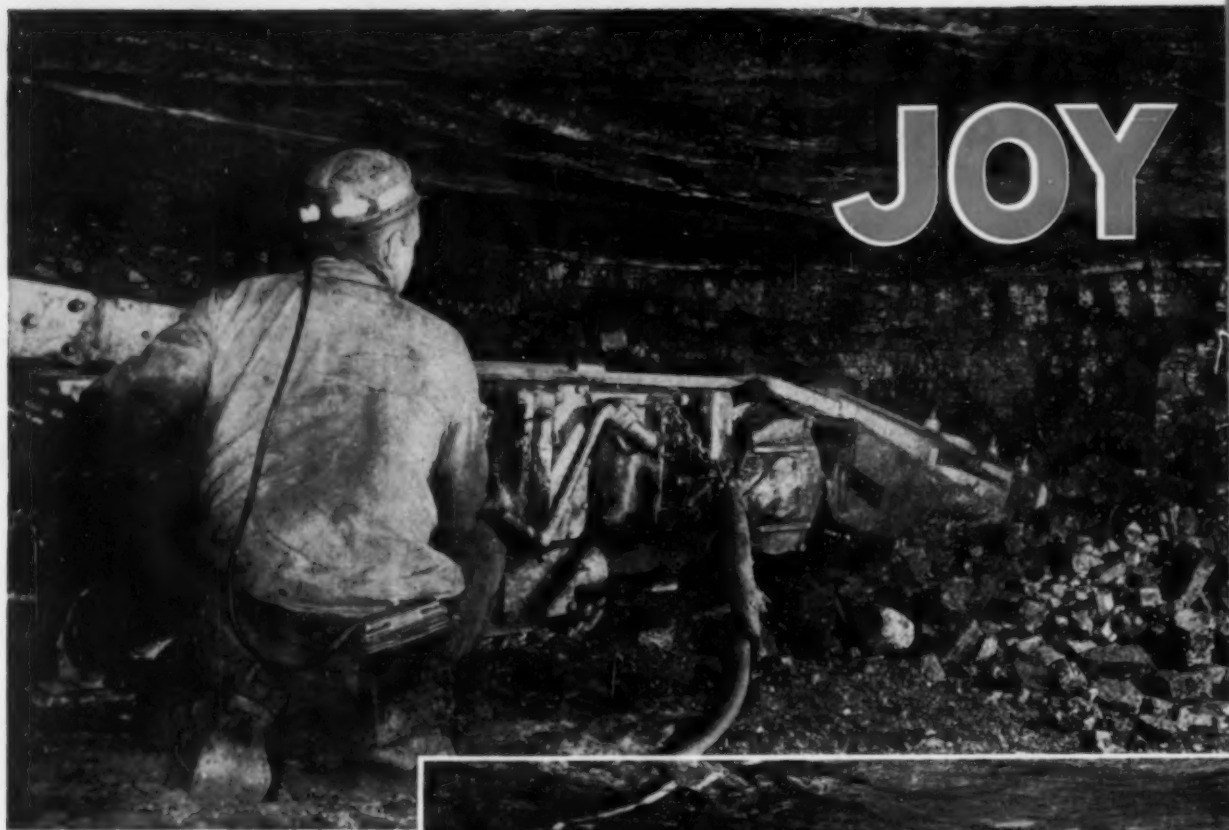
SPECIFICATIONS			
Order No.	Diameter	Length	Shank
APT-1¾	1¾"	2½"	¾" sq.
APT-1½	1½"	2½"	¾" sq.
APT-1½	1½"	3½"	¾" sq.

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

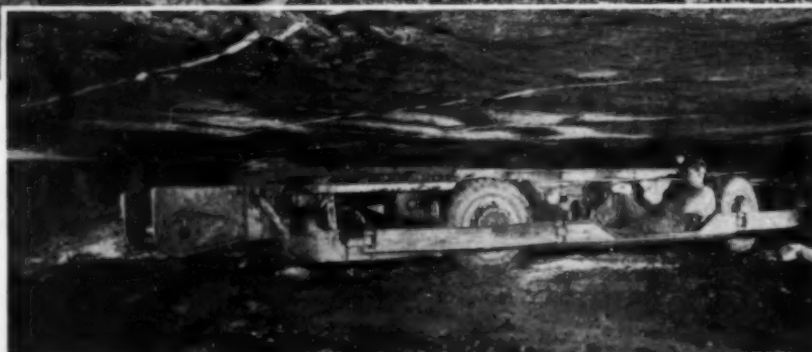
JOY



20-BU LOADER

8-SC SHUTTLE CAR

12-RB CUTTER



"12-20-8" COMBINATION

AVERAGES 950 TONS A DAY (2 SHIFTS)

HERE'S the typical operating performance of a Joy low-vein equipment team, recorded during a recent three-month period.

Two 12-RB rubber-tired cutters, two 20-BU loaders and four 8-SC shuttle cars, operating in a West Virginia mine on a "two-working, one-off" shift basis, are producing an average of 950 tons of coal every day . . . and have reached peaks of 1200 tons per day.

The mine is operating in the Peerless Seam, in coal that varies in height from 35" to 37". A channel sample shows analysis of 3% ash, 1% sulphur. The bottom is fire-clay, and the top is normally very hard slate, but there is a draw slate varying from 1" to 3" in thickness that comes with the coal. This draw slate is not picked before the loading operation underground, but is removed by a man at the outside and near the belt head piece. Main haulage consists of two Joy MTB-30 belt conveyors, 1000 and 2600 feet long respectively.

The total number of men on the payroll is 55 on three shifts, with the third shift consisting of five men on equipment-greasing and supply duties. Production per man-day therefore varied from 17.3 tons average to 21.8 tons at the peak—a highly favorable rate in 36" coal.

In every coal-producing area and under all seam conditions, Joy mining equipment is setting the records for low-cost, high-production operation. Let us work with you. *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*



Consult a Joy Engineer

WED CLS449

12-RB CUTTER

A rubber tire-mounted, mobile cutting machine only 26" high, supplied either as a bottom cutter or top cutter. Hydraulic tramming, steering and controls, with hydraulic pump driven by a separate motor. Ample capacity to keep out in front of the loader.

20-BU LOADER

Over-all height is only 24", yet maximum capacity is 8 tons per minute. Employs the exclusive Joy loading principle. Gathering arms and conveyor are independently driven. Has swinging tail conveyor, individual crawler-tread drive, and exclusive Magnetax control.

8-SC SHUTTLE CAR

Rubber tire-mounted, highly flexible and maneuverable. Only 26" in height, with a level capacity of 2 tons, the 8-SC has four-wheel positive drive, four-wheel hydraulic steering, and four-wheel Joy single-disc brakes—also hydraulically-driven cable reel and hydraulically-adjustable elevating discharge.

JOY

WORLD'S LARGEST MANUFACTURER OF
UNDERGROUND MINING EQUIPMENT

What
do
you
see...



when you look at your track?

Last time you inspected your haulage system, what did you see? Just track? Or did you see a heavy-duty, up-to-date system that will handle tomorrow's loads as well as today's?

If there are doubts in your mind, we suggest you talk with a Bethlehem engineer. He is well grounded in mining operations, and amply equipped to help you modernize your trackwork. If need be, he'll start from scratch with a complete new layout design. Here is how he operates:

First, of course, comes a visit to your workings, and discussions of your operating problems. Next, plans are drawn up for approval. Once you give the nod, all track and compo-

nents are assembled at our plant to be sure they fit perfectly.

Every splice bar, track spike, bolt and nut is included, to make installation at your end as fool-proof and efficient as possible. The job won't be considered complete until you have a smooth-running, heavy-rail layout that will serve you dependably for many years to come.

Sounds high-priced, you say? Our experience says "no." Actually, a new Bethlehem layout will run you far less, in the long pull, than the cost of not modernizing. One of our engineers will be glad to talk to you about the results other mines have achieved with Bethlehem haulage systems.



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributors: Bethlehem Steel Export Corporation

BETHLEHEM PREFABRICATED TRACK



FAIRMONT

PREPARATION PLANTS

provide top separating efficiency - *ECONOMICALLY!*

- 1 Coordinated, qualified design, engineering, fabricating and erecting services.
- 2 Independent choice of equipment best adapted to your specific requirements.
- 3 Skilled pilot crews smooth out operational "know-how" of your own men.
- 4 A well-planned installation that amply meets your present needs while providing for future requirements.

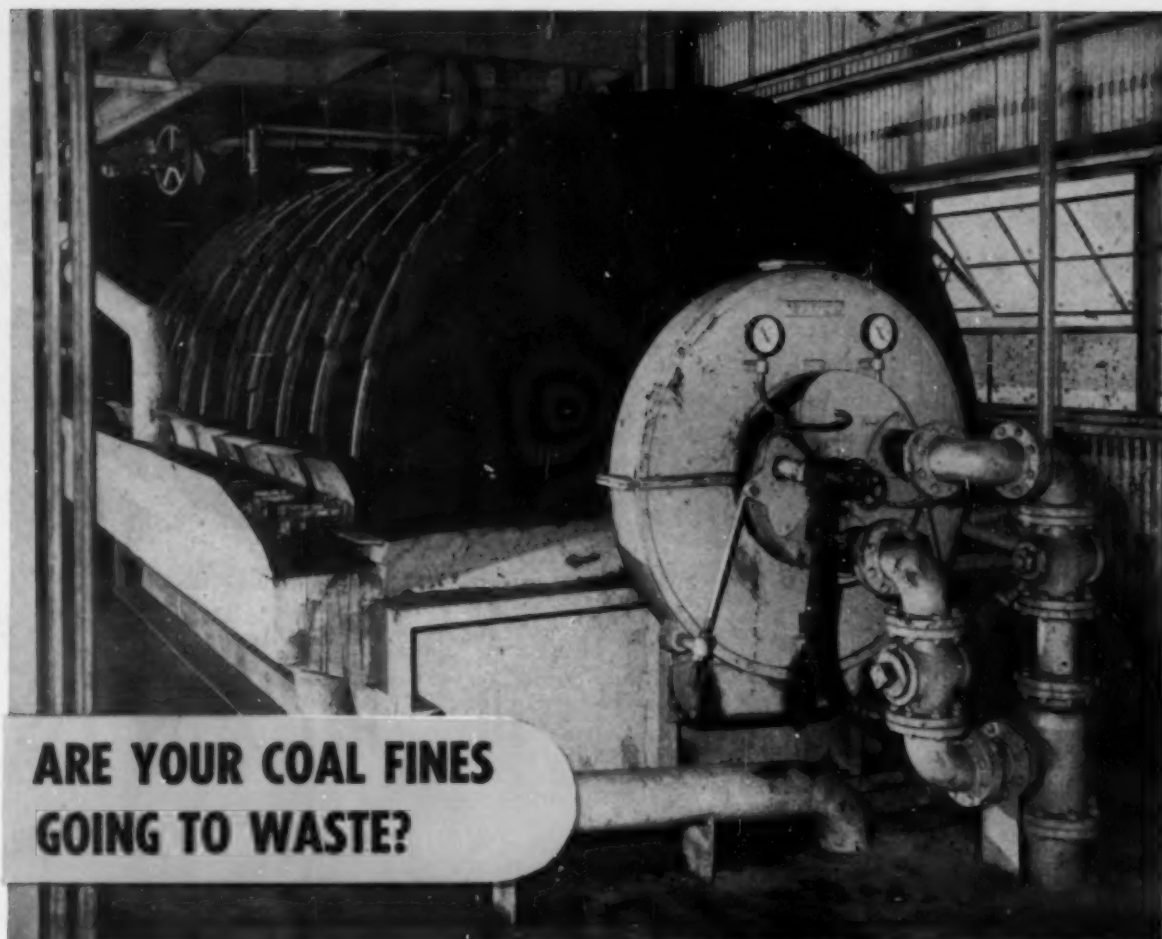
When you have a coal preparation problem, let Fairmont provide a plant that will give increased separating efficiency at low operating economy. Fairmont-built Preparation Plants guarantee product uniformity and over 99% separating efficiency through a wide product size range of $\frac{1}{8}$ " to 10" in any tonnage capacity.

For *Something Extra* in upgrading your coal product . . . call a Fairmont Engineer!

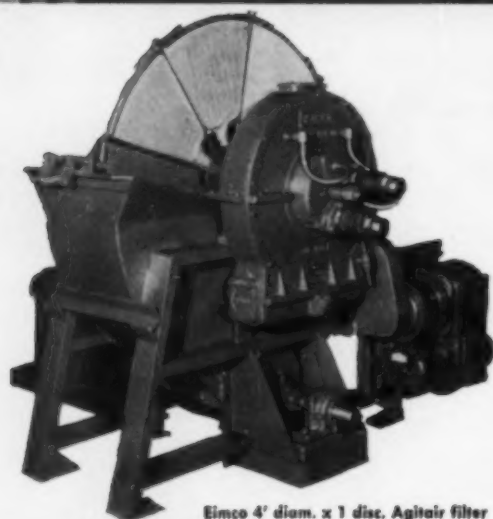
FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET
AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.



ARE YOUR COAL FINES GOING TO WASTE?



Eimco 4' diam. x 1 disc. Agitair filter

Coal fines are an economical source of revenue, they can be reclaimed and will pay in a short time, for all equipment necessary to make the installation.

Several flow sheets employ Eimco filters as the dewatering equipment in plants set up to reclaim the fine coals. Eimco filters are best because they do the job for less money.

Eimco filters will dewater greater tonnages per square foot of filter area per hour. They are simple in design and built for long periods of continuous operation with a minimum of attention. They produce a thick, evenly distributed cake formation, uniformly dried to low moisture content. Eimco filters have a clean discharge of the cake which provides much greater bag life and many other advantages.

Write for complete information on fine coal dewatering with Eimco Agidisc filters.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A.

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You Can't Beat An Eimco!



Pittsburgh Coal Co. reports...

Installation of belt reinforced with Du Pont "Cordura" helps increase production 67%... reduces maintenance



Reinforced with Du Pont "Cordura", the 800-foot conveyor belt carries coal and rock to the hopper at the discharge end of the belt. From the hopper the coal and rock go to coal cars below.

Production has gone from 600 to 1,000 tons per hour since the installation of the fast-moving conveyor belt system shown above at the Montour #4 mine operated by the Pittsburgh Coal Company.

Reinforced with Du Pont Cordura® High Tenacity Rayon, the belt in this system carries coal and rock throughout rugged 100-hour work weeks. The company's Engineering Department recommended this belt, manufactured by the Goodyear Tire & Rubber Co., because of its long service life and the expectation of more tonnage. The company reports fewer men and much less maintenance are required since adopting a conveyor belt system of operation.

The extra strength of Du Pont "Cordura" permits a belt that's thinner yet stronger. And the low stretch of "Cordura" reduces costly downtime for take-up and resplicing.

Investigate the advantages of "Cordura" before ordering your next conveyor belt. Write for the names of suppliers... and send for free copy of the new booklet, "Mine & Quarry Facts About 'Cordura'". Address: Textile Fibers Dept., Room 11504, E. I. du Pont de Nemours & Co. (Inc.), Wilmington, Del.

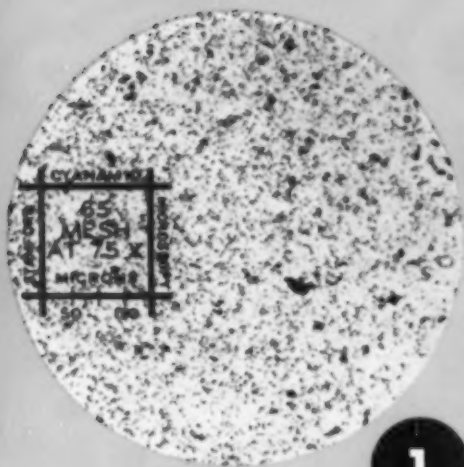
*Reg. U. S. Pat. Off.

Du Pont "Cordura" High Tenacity Rayon
STRENGTH AT LOW COST

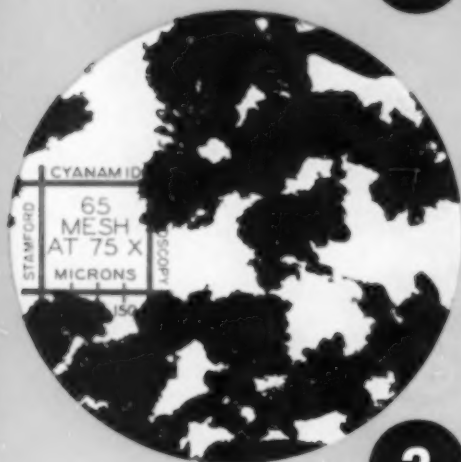


BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY

Stream Pollution Problem?



1



2

Read how

CYANAMID AEROFLOC® REAGENTS

flocculate wash-water fines...

settle solids quickly...

assure clear plant-effluent.

Study the photomicrographs at the left. They show how the addition of a small amount of a Cyanamid AEROFLOC Reagent causes slow-settling wash-water fines (1) to agglomerate into relatively massive, fast-settling flocs (2).

Now study the action photographs on the page opposite. Photo (3) shows 100 ml. samples of a colliery wash-water that is well above maximum legal turbidity. Photos (4) and (5), taken 18 seconds and 60 seconds later, show the incredibly fast settling-action caused by the addition of a Cyanamid AEROFLOC Reagent.

AMERICAN *Cyanamid* **COMPANY**

Now Consider These Actual Plant-Operating Results

The operating condition: A 140-foot diameter thickener handling 10,000 gallons per minute of washery effluent, averaging 3-4% solids, 50% of the effluent re-used, 50% discharged to river.

BEFORE: Overflow sometimes contained more than the 1000 ppm solids permitted by State anti-pollution laws. Lime was used to improve settling, but labor and material costs were high.

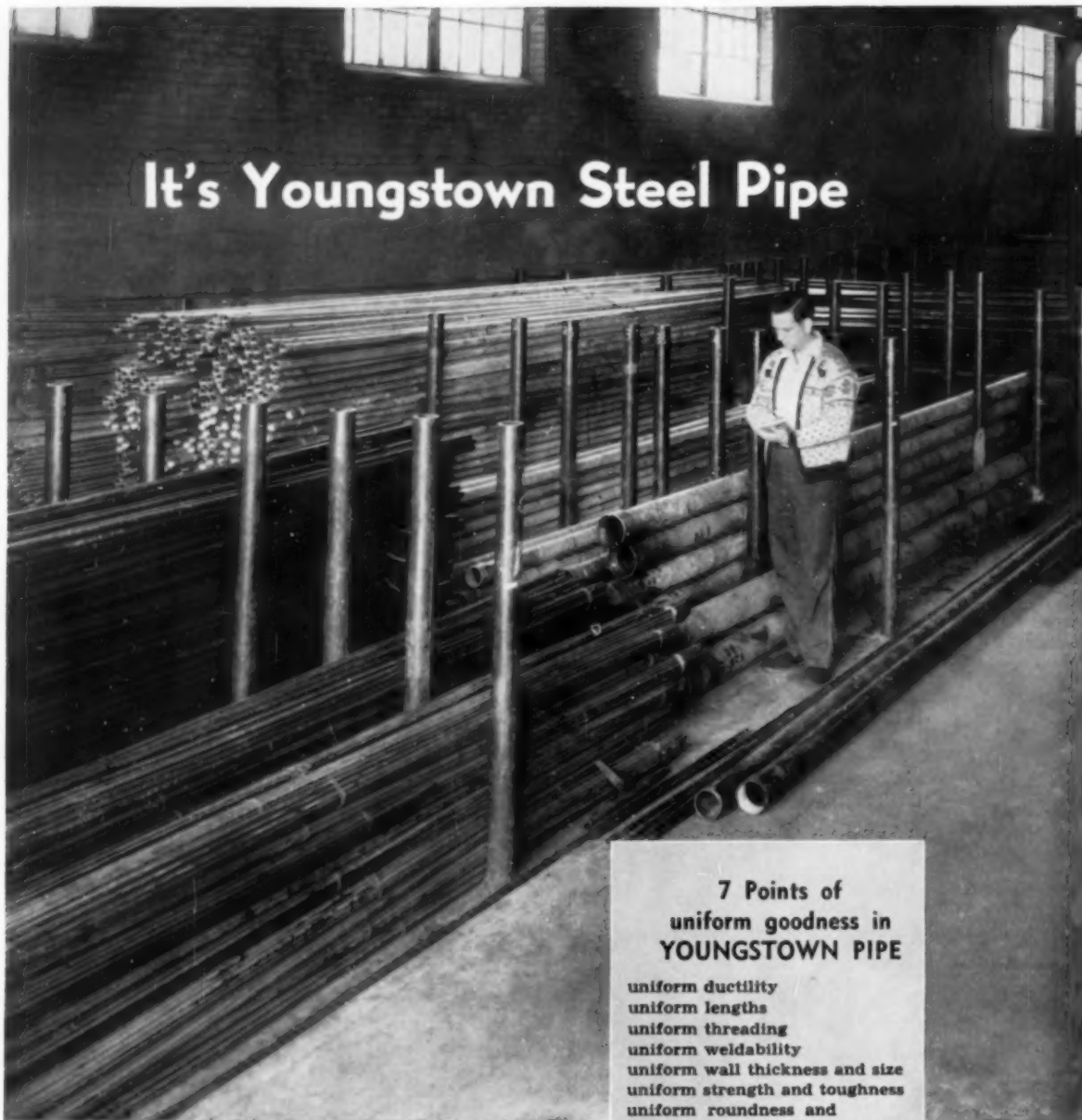
AFTER: One pound of AEROFLOC per hour treats flow of 10,000 gallons per minute, keeping solids in overflow well below 1000 ppm solids required by law. AEROFLOC drip fed as 1/2 % solution. Cost now is only 1/5 of previous treatment method.

AEROFLOC Reagents may be the answer to your waste disposal and stream pollution problems. A Cyanamid Field Engineer will be glad to work with you on their application. With everything to win and nothing to lose, why not write for further information on the use of AEROFLOC Reagents?



MINERAL DRESSING DEPARTMENT 30 ROCKEFELLER PLAZA, NEW YORK 20, N.Y.

It's Youngstown Steel Pipe



7 Points of uniform goodness in YOUNGSTOWN PIPE

uniform ductility
uniform lengths
uniform threading
uniform weldability
uniform wall thickness and size
uniform strength and toughness
uniform roundness and
straightness

●The Youngstown Pipe Distributor near you carries a complete stock of steel pipe. He is ready to serve you—to save you time and money. Use his facilities and avoid the expense of carrying an excess inventory. Phone your Youngstown Pipe Distributor for your steel pipe requirements.

Youngstown



THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of
Carbon, Alloy and Tool Steel

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SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT
AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE -
HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES



END YOUR SPLICING PROBLEMS

WITH J&L *JalKlamp*

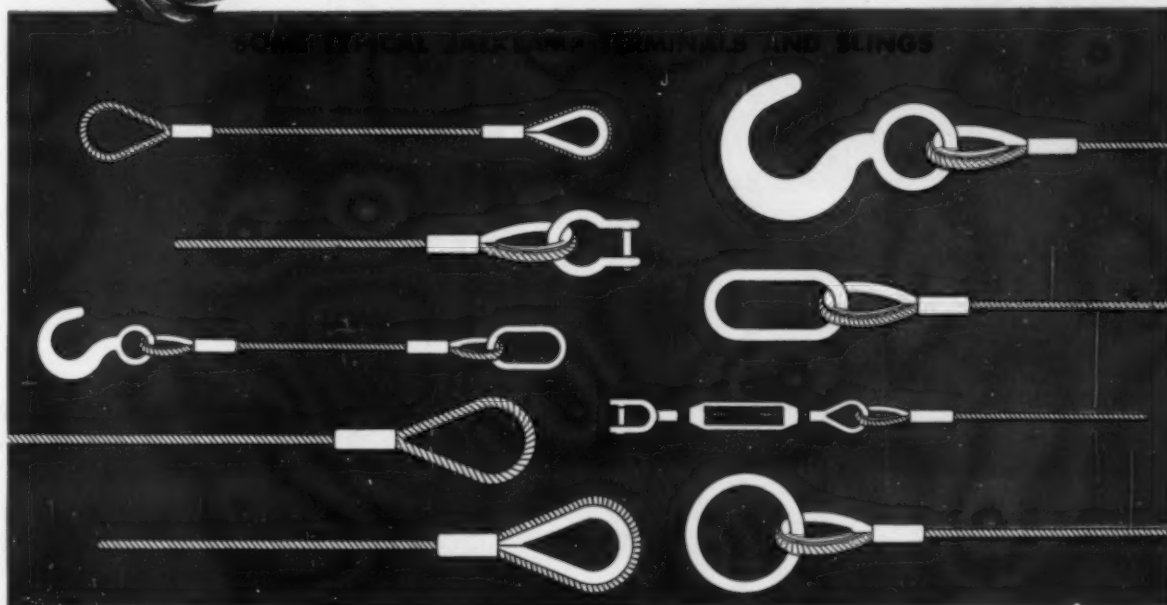
SLINGS AND TERMINALS

Now, thanks to JalKlamps, you can order J&L Wire Rope with terminal splices which afford unsurpassed strength, corrosion resistance, safety and ease of handling. And JalKlamp Terminals cost far less than you would spend to do the job yourself with conventional tucked splices.

J&L JalKlamps are new non-corrosive special alloy sleeves with tremendous strength and unique cold forming characteristics. When squeezed around wire rope by a special hy-

draulic press, the JalKlamp metal "flows" into the spaces between the wires in the strands and the strands themselves, producing a neat, homogeneous splice.

Take advantage of the extra economy . . . long service life offered by J&L JalKlamps. You can get J&L Wire Rope Terminals and Slings spliced with JalKlamps in all standard constructions, and in diameters from $\frac{1}{8}$ " to 2" with these centers—SpringKore, PlastiKore, Fibre Core and IWRC.



**HIGH
STRENGTH**



ECONOMICAL



NON-CORROSIVE



**EASY
HANDLING**



WATERTIGHT



**NEAT . . .
PERMANENT**

**J&L
STEEL**

Jones & Laughlin
STEEL CORPORATION — Pittsburgh

Profits start in the Pit!



Their dependable performance and high job availability, combined with big payload capacity and fast travel speeds, have made "Eucs" the preferred hauling equipment for open pit operations in both the anthracite and bituminous fields. Because they're built for tough off-the-highway service, Rear-Dump and Bottom-Dump Euclids make more profits for owners by cutting the cost of hauling coal, overburden and mine waste.

Your Euclid distributor can show you the way to lower hauling costs... have him provide a hauling production and cost estimate for your operation... there's no obligation, of course, so get in touch with him soon.

In the anthracite fields of Pennsylvania Rear-Dump "Eucs" outnumber all other makes of off-the-highway units combined... more than 800 of them are working in these open pit mines. Because of their unequalled record of high production and low hauling cost, it was only logical "Eucs" were selected by Wadesville Production Co. Twenty of them, ranging in size from 22 to 34 ton capacity, are at work on this huge stripping operation.



EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio



Maumee Collieries Co. of Indiana uses four 40-ton Euclid Coal Haulers to haul from the pit to the plant at Mine No. 28 near Jasonville. Loaded haul of 5000 feet takes just over 4 minutes and a complete cycle, including loading which requires 4.4 minutes, is made in 16 minutes or less. "Eucs" are also working at two other mines of this big producer... Maumee has been a Euclid user since 1946.



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE





McCarthy

SELF-MOVING DRILL

HEAVY - RUGGED - POWERFUL



42" COAL RECOVERY DRILL

Mining Low-Cost Quality Coal...

This hydraulically self-moving 42" McCarthy Coal Recovery Drill is mining up to 500 tons of clean, low-cost, quality coal per day at Hodgeville, West Virginia. It has a three-man crew — operates in pits as narrow as 34 feet. Operator has all-around clear vision, including highwall. Jacks, hydraulically operated, lift 48 inches. Model 12 is built to handle augers 24 feet long from 16 inches to 48 inches in diameter as specified. Other McCarthy Coal Recovery Drills use augers 4, 6 and 12 feet in length.

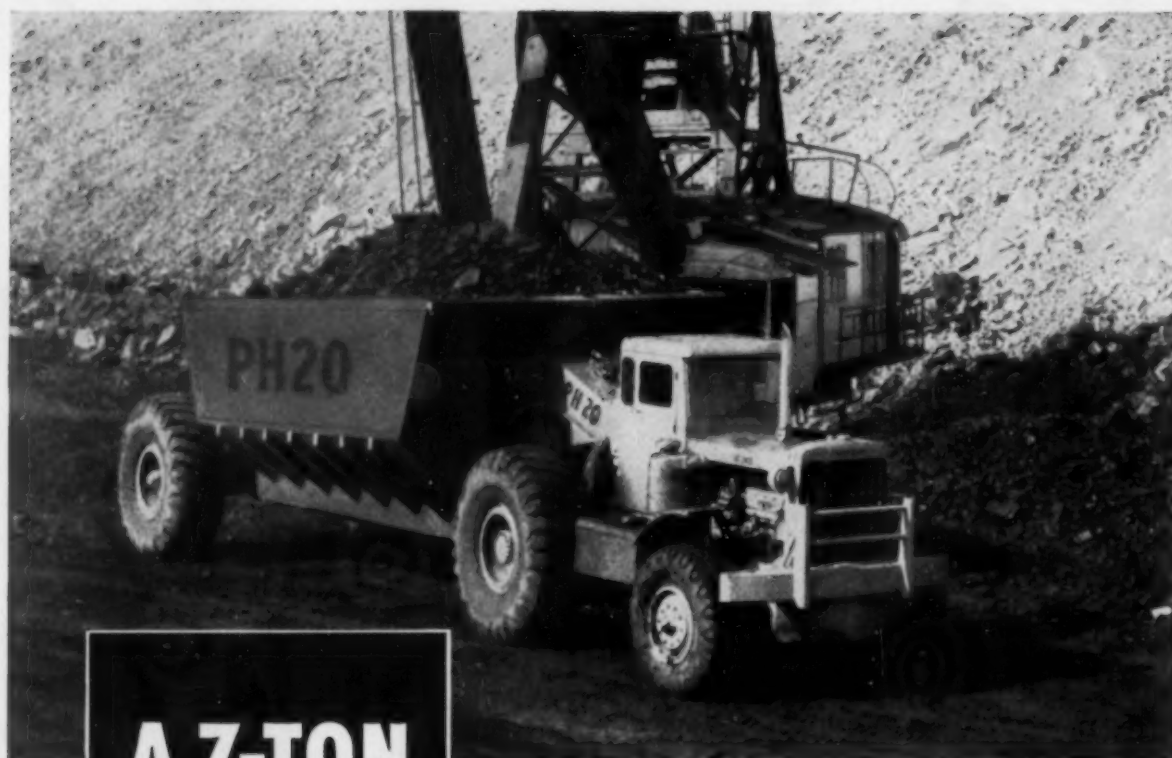
McCarthy barrel type cutting head produces maximum quality and quantity of lump coal.

THE SALEM TOOL COMPANY

763 SOUTH ELLSWORTH AVE.

• SALEM, OHIO, U. S. A.





**A 7-TON
BONUS
ON
EVERY
TRIP!**

Athey
SPECIALIZED
COAL HAULING
EQUIPMENT

Compare the Athey PH20 Coal Hauler with any other 40-ton hauler. You find the total weight of the PH20 is 7-tons less than the others, yet the strength and long life of the PH20 is actually greater!

High strength, premium-alloy steels make the difference and it's a difference that enables the PH20 to cut your costs. You haul bigger payloads, you reduce tractive effort, you haul faster, you prolong tire life and save many maintenance dollars, *you get a bonus of 7 tons on every cycle.*

Put your horsepower to work hauling coal, not deadweight. Put an Athey PH20-Cat DW20 team to work in your pit!

ATHEY PRODUCTS CORPORATION

5631 West 65th Street • Chicago 38, Illinois

Your Athey-Caterpillar Dealer can furnish complete information on the PH20 Coal Hauler and can supply a copy of the new fact-filled folder, "Low-Cost Coal Hauling." Or you can obtain a free copy by writing direct to Athey Products Corporation, Dept. CA124. It will be worth your while!

For the
MOST DEPENDABLE

MOST ECONOMICAL

COAL CRUSHING EQUIPMENT

McLANAHAN

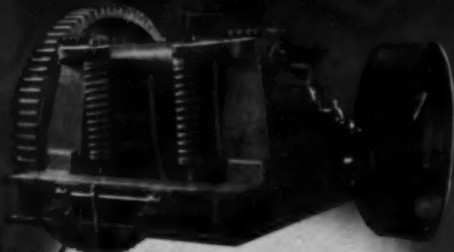
Backed by 117 years of manufacturing experience, McLanahan builds crushing equipment for the ultimate in economy through long service and minimum maintenance costs. This equipment, which has been thoroughly service-proven on the most demanding of domestic and foreign installations, is available in a great variety of sizes for every coal crushing requirement. A pioneer in the development of many types of crushing equipment—including the first single roll crusher produced in 1894—McLanahan is equipped to produce complete units, from feeders, primary and reduction crushers through elevators, sizing screens, etc.

WRITE FOR BULLETINS: Separate bulletins are available on all the crushers shown, and on a wide variety of other equipment.

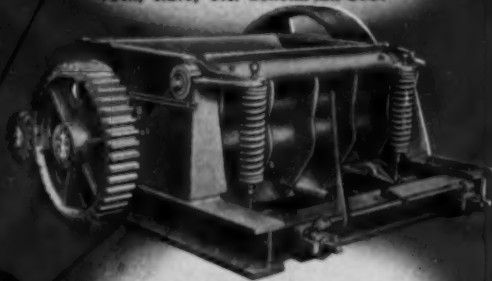
McLANAHAN & STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters Since 1835
Hollidaysburg, Pennsylvania

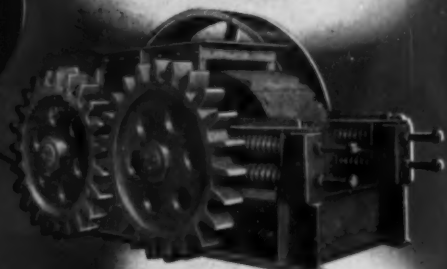
Dependable Products: Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plants and Apron Feeders, Ball Grinders, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Drags, Holes, Jigs, Dry Pans, Dryers, Scrap Handlers, Pulleys, Bearings, Bushings, Shafts, Rollers, Big Saws, Elevator Buckets, Gratings, Car Wheels, Pumps and Pump Castings.



Single Roll Rockmaster Crusher for both primary and secondary crushing. Used in crushing mine refuse, sulphur balls, sand, rock, slate, etc. Bulletin RM-803.



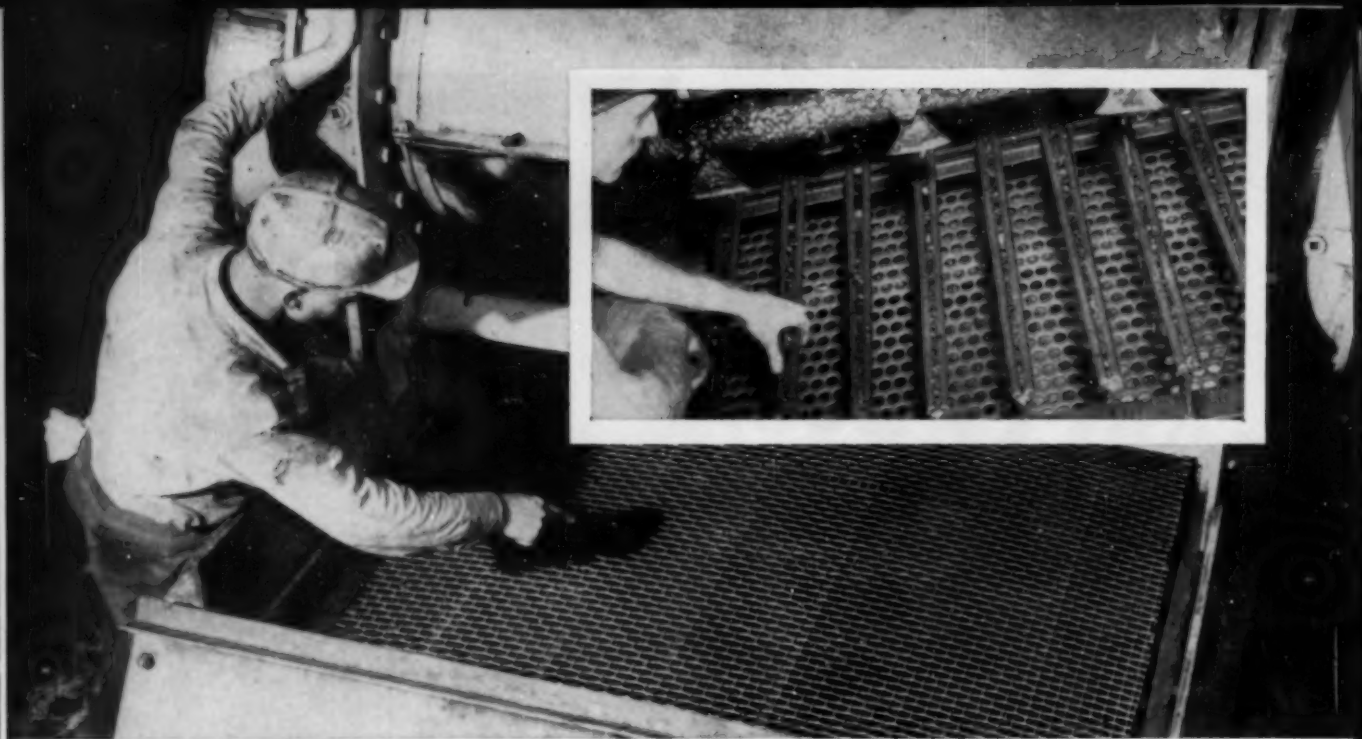
Single Roll Black Diamond Crusher with exclusive automatic steelstrut toggle and quick adjustment. Bulletin BD-437.



McLanahan Double Roll Crusher for various reductions of medium-size material. Bulletin DR-447.



The low cost McLanahan Bentam Buster Single Roll Crusher. Bulletin BB-503.



Stainless sizing screen and (inset) Stainless classifying screen.

Long-life Stainless Steel equipment helps Consol operate its big Hendrix Plant with a crew of only five men per shift

● At the Hendrix Coal Cleaning Plant, Deane, Kentucky, of Consolidation Coal Co. (Ky.), Div. of Pittsburgh Consolidation Coal Co., extensive use of Stainless Steel in screens and chutes plays a vital part in cutting operating costs to a bare minimum. Since Stainless equipment lasts so much longer, without maintenance, replacements are reduced considerably and there are big savings in labor and downtime. In fact, a crew of only five men per shift operates the big 4000 ton-a-day plant and does all the necessary maintenance work as well.

This ultra-modern plant, designed to be the "best plant possible," took full advantage of the outstanding abrasion and corrosion resisting qualities of Stainless Steel. Stainless

was used for three reasons. First, to get longer screen life. Second, to better maintain the proper coal sizes (the less a screen wears, the better control there is over size). Third, to add to overall plant efficiency by reducing replacements with their resulting losses in production.

The record shows that Stainless Steel can be counted upon for plenty of added service wherever used:

The fine coal dewatering screens outlast ordinary steel screens many times. The first couple, which take severest impact as well as abrasion, last two years, handle 260,000 tons. The rest of the dewatering screens—installed in 1950—are still in service after handling 600,000 tons!

The classifying screen handles 95% of all coal processed. Lasts 2½ years, handling 1,500,000 tons.

The washer discharge sluice screen, handling all the coal processed and taking severest impact (up to 8" coal), lasts 8 months.

The sizing screens (top and bottom decks) far outlast ordinary steel. The first section, where impact is greatest, now serves 5-6 months, compared to only 2 weeks for carbon steel. Middle and discharge sections last 10 and 8 months respectively as compared with 4 months for each before.

In addition, a chute, a riffle sampler and the sample crusher are all giving excellent service without replacement.

* * * *

Why not take advantage of the superior durability of Stainless Steel in your plant—wherever abrasion or corrosion have caused too-frequent replacements? And for the best results, be sure that you use perfected, service-tested USS Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
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USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS



PIPE • TUBES • WIRE • SPECIAL SECTIONS

4-2251

UNITED STATES STEEL

ROLL IT OUT

You'll Do It Better
and Cheaper

with

AIRDOX

NON-EXPLOSIVE MINING METHOD

1. Actual cost of dislodging is less in practically every case.
2. Coarse coal—speeds up loading, saves wear and tear on equipment.
3. Less fines produced—reduces cleaning costs, increases cleaning plant capacity.
4. Roof and rib shattering is minimized—less shoring needed.
5. Degradation of coal is reduced—from mine face to user.

Find out how much AIRDOX can improve your operation and reduce your costs. Write for free survey, without obligation to you.

CARDOX CORPORATION • BELL BUILDING • CHICAGO 2, ILLINOIS

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St. Clairsville, Ohio
Phone: St. Clairsville 419

Pikeville, Kentucky
Route 2, Box 99
Phone: Robinson Creek 6
Leadville, Colorado
Phone: Boulder
1000-101 2-7299

Liberty, Pennsylvania
Box 427
Phone: Liberty Colonial 3-6922
Camden-on-Geary, W. Va.
Phone:
Camden-on-Geary 2181

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327 Northwest 10th St.
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Rivers 4-4244

**profitable production
doesn't have to stop
when your mine is
"stripped-out"**



CARDOX *Surface*
AUGER MINERS

drill
bonus tonnage from seams
buried by excessive overburden

When excessive overburden stops stripping, you can still mine coal profitably—and without extra development expense! Drilling 100 ft. or more with Cardox Surface AugerMiners into *already exposed* seams extends your mining operations—nets you as much as 50 tons of coal per man-shift that otherwise would have to be left behind. And it's high grade coal, too. Vertical direction control keeps auger in the best

part of coal seam, away from rock and shale. A choice of cutterheads helps determine size. Coal comes out in a steady flow, convenient for loading by mechanical means. A full description of CARDOX AugerMiners and facts about how they can help you *continue profitable production* are available in a free AugerMiner bulletin. Write for it—or see your Cardox representative.

NOW—CHOOSE YOUR POWER

Either 155 HP gasoline or diesel engines are now available on AugerMiners. Drills hole up to 38 in. in diameter.

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Phone: St. Clairsville 619

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Phone: Library Colonial 3-6910

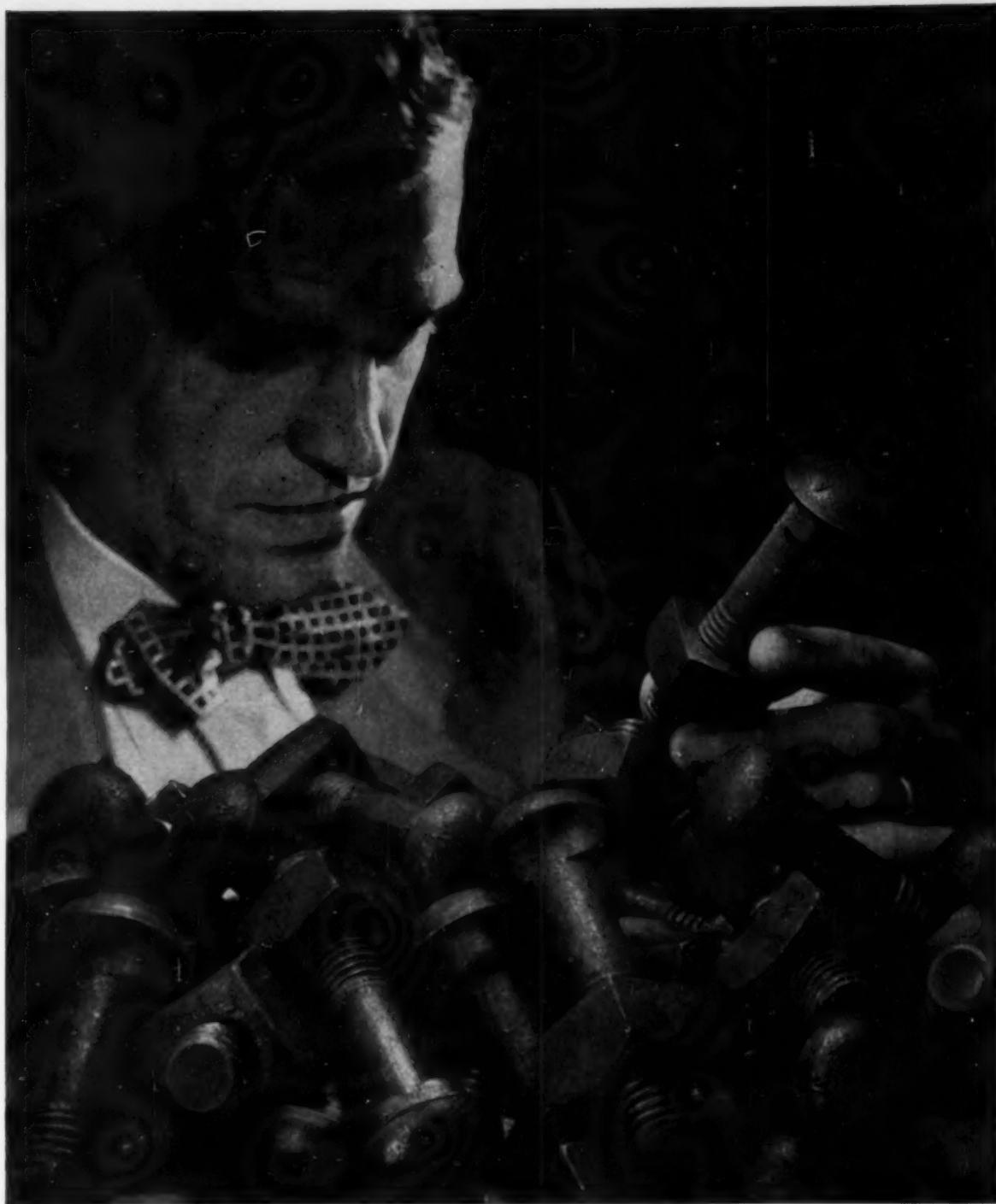
Camden-on-Gauley, W. Va.
Phone: Camden-on-Gauley 2181

Evansville, Indiana
307 Northwest Fifth St.
Phone: Evansville 2-8944

Pikeville, Kentucky
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Phone: Robinson Creek 5

Louisville, Colorado
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Murray 4-6564



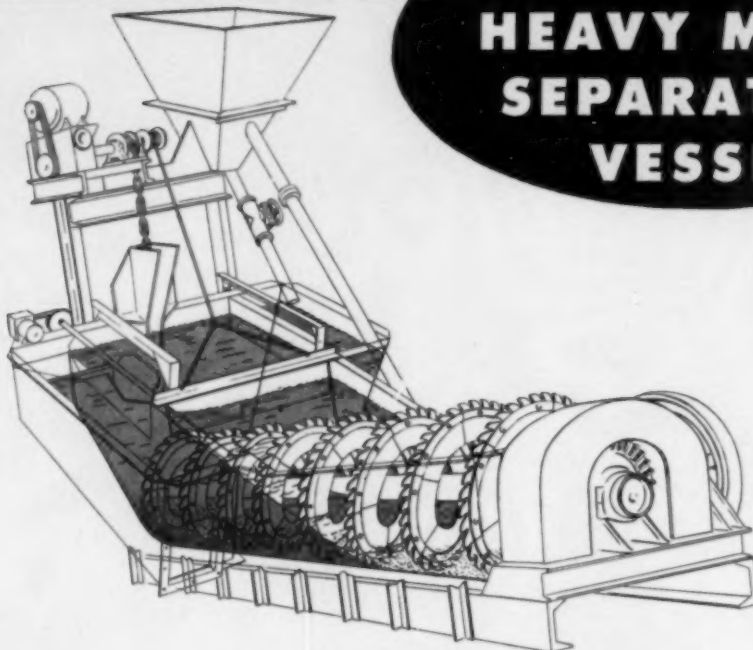
"Bethlehem Track Bolts have strong, oval necks, rolled threads, and accurately formed heads. No wonder we like them."

Spikes and machine bolts, too!



PROVED ADVANTAGES OF

AKINS HEAVY MEDIA SEPARATORY VESSEL



THREE PRODUCT SEPARATION IN ONE MACHINE

When a separate sink float and middlings product is required to improve recovery or metallurgy, a single Akins Vessel can be used. The inherent nature of the Akins Vessel causes a zone in which the specific gravity of the suspended medium is higher than average. The rotation and forward movement of the spiral results in a so-called high density eddy, and when medium is added at two different points, float is prevented from traveling forward to the middling zone, and the middling particles are separated from the sink product since they are unable to remain submerged in a media of higher specific gravity. Two separate overflow weirs are provided to handle the float material and the middling material. The true sink material discharges from the vessel in the standard way.

Other Outstanding Advantages of Akins

Entire vessel is visible and accessible.

Variation in feed rate or grade of feed is not detrimental.

Large pool area and volume facilitates better recovery of values from fine sizes.

Circulation of media at lower gravity and viscosity.

Gradation of gravity and viscosity from feed entry point to sink removal point provides natural cleaning of sink.

No interference of product discharge.

Akins — the ORIGINAL spiral type classifier.

COLORADO IRON WORKS CO.

1624 17th Street • Denver 2, Colorado

AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS

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A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.



Ray-Man "F" Conveyor Belt—More use per dollar

Ray-Man "F" Conveyor Belt—More use per dollar

Ray-Man "F" Conveyor Belt—More use per dollar

Ray-Man "F" Conveyor Belt—More use per dollar

Ray-Man "F" Conveyor Belt—More use per dollar



FOR UNDERGROUND BELT

The latest exclusive development of R/M engineers is the "XDC" cover which protects heavy duty conveyor belts against wear, abrasion, cuts and tears to a degree never before attained.

... Ray-Man "F" is engineered to stand up under the abusive service of run-of-mine coal without ripping or puncturing... where pulleys are small... and where high fastener-holding ability is required. The unique properties of synthetic strength members used in Ray-Man "F" make possible these advantages, plus the R/M features you require for general purpose belt efficiency and economy—easy troughability, flexibility, exceptional resilience for shock loading, better cover adhesion. Ask the R/M representative for Bulletin 6915. If heavy impact loading is a problem in your coal handling operations, ask him about extra-cushioned Homocord Conveyor Belt. R/M field engineers back him up to give you MORE USE PER DOLLAR with the right R/M conveyor for your job. And they can also show you MORE USE PER DOLLAR engineering in R/M hose, transmission and V-Belts.



MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY
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Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Packings • Brake Linings • Brake Blocks
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SEEK AND TIMKEN SIG.

WHAT THEY SAY.



"We are hauling 100 tons of ore, weighing 65 lbs. each, 1200 lbs. and with the weight of the wagon, 1000 lbs., a total of 2200 lbs., with one (1) horse with one, since we had our wagon equipped with Timken Roller Bearing Axles."

WALSHBURY BREWING CO.,
Jennings Place, Mass.



"I had because the wagon I pull is not equipped with TIMKEN ROLLER BEARING AXLES. I have to pull from 5000 to 6000 lbs., and it is killing me."



From experience by the axle (1) and (2) superior with one, compared to the other Timken Roller Bearing.



Timken Roller Bearing Axles

FORMERLY



TWO HORSES
Were required to pull this Surrey.

NOW



ONE HORSE
Can pull this Surrey by the bit.

COMP. BUCKEYE BUGGY CO.
Manufacturers FINE VEHICLES.

COLUMBUS, O., March 26th, 1914.
St. Louis, Mo.

Gentlemen—We are pleased to say that the Timken Roller Bearing Axle has proved a great success wherever we have used it.

Our particular vehicle that we put it on, a large passenger carriage, we shipped to a customer in Chicago. He was not ONE HOUR in pulling this large vehicle with SIX PEOPLE on it. This certainly shows a great saving in draft and we are just to have our first complaint regarding them.

We think that you have the right principle, and that that principle is made a success by the principle of the axle which you mention in fitting up the horse and roller. We expect to largely increase our use of your axle. We are,

Very truly,
(Signed) Buckeye Buggy Co.,
For C. E. Johnson, Manager

COMP. KNIGHTSTOWN BUGGY CO.
WHOLESALE MANUFACTURERS OF VEHICLES.

KNIGHTSTOWN, Ind., April 15th, 1915.
St. Louis, Mo.

Gentlemen—Years of the job in hand and will say in reply that the roller bearing axle we bought from you have more than given satisfaction. They have put on a heavy survey, usually a two-horse vehicle, but with Timken Roller Bearing Axle one horse can pull the survey almost by the bit.

Yours respectfully,
Knightstown Buggy Co.

TIMKEN
Roller Bearing
AXLES

Reduce draft over 50 per cent.
Require oiling only twice a year.
Can be substituted for ordinary axles on old vehicles.
Can be used with any standard wheel, old as well as new.
Are mechanically perfect. No breakages. Practically no wear.
Are easily adjusted. No play.
No rattling. No lost motion.
Are adapted to all vehicles from the lightest speeding wagon to the heaviest truck and railroad car. Best on earth for automobiles.

Do your horses play out?
Do you want to double their serviceable life?
Do you want to double the earning capacity of your vehicles?
Do you want to decrease the number of horses required to do your work?
Do you want to reduce stable expenses?
Do you want to pass other drivers?
Are you tired of oiling your axles every day or two?

IF SO, EQUIP ALL YOUR VEHICLES WITH

TIMKEN
ROLLER BEARING AXLES.

FOR SALE BY
All First Class Carriage and Wagon Manufacturers and Dealers.

Write us for booklet "Saving the Horse"

Address all communications to
TIMKEN ROLLER BEARING AXLE CO.
Department F, St. Louis, Mo.

IT MAKES A HORSE LAUGH



To Equip the Vehicle with
TIMKEN ROLLER BEARING AXLES

BECAUSE
The work is made easy.
The car can do double the work it could formerly.
The life-time is doubled.

THIS OWNER LAUGHS EVEN MORE



BECAUSE
The draft on his vehicle is reduced over 50 per cent.
The earning capacity of his vehicle is doubled.
He has the fastest vehicle if not the fastest horse.
He has to oil his axles only twice a year.

In terms of performance—

TIMKEN® bearings still give you more for your money than any other bearings you can buy

IN 1901, Timken® tapered roller bearings were used mainly in wagon wheels. They saved "horsepower", manpower, materials and equipment. They were the best bearings you could buy.

Today, 53 years later, Timken tapered roller bearings are used in thousands of applications. They *still* save horsepower, manpower, materials and equipment. And they're *still* the best bearings you can buy.

Why? Because we've never stopped improving Timken bearings. One example: we're the only U. S. bearing manufacturer that makes our own steel to control bearing quality every step of the way.

In terms of performance, Timken bearings *still* give you more for your money than any other make. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER

BEARING TAKES RADIAL AND THRUST ——— LOADS OR ANY COMBINATION



8 YEARS AT HARD LABOR and this neoprene conveyor belt is still going strong. It's one of five neoprene belts at the Dorrance Colliery of the West Virginia Coal and Coke Company. These belts, totaling 3,656 feet in all, handle 10,000 tons of coal daily at this processing plant. They're exposed to grease, lubricating oils, sunlight, weathering, and constant abrasion from the coal. But conveyor belts of neoprene can take this brutal punishment without softening, cracking, or tearing. They can be counted on to keep giving dependable service for years to come.

Next time you order conveyor belting, specify neoprene—the same tough material used to jacket mine trailing cable. Neoprene offers you outstanding *resistance to oils and grease, sun and weather, heat and flame*. You get long belt life, big savings on replacement costs.

Keep abreast of the latest neoprene developments . . . mail the coupon below today!

NEOPRENE

The rubber made by Du Pont since 1932



Better Things for Better Living . . . through Chemistry

FREE! THE NEOPRENE NOTEBOOK

Every issue contains new illustrated case histories, interesting articles, new applications of neoprene. Clip and mail this coupon to E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division CO-12, Wilmington 98, Del.

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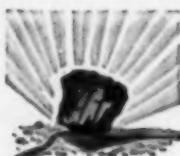


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New! Improved! SUPER SERVICE
heavy duty portable cords and cables



...better
impact and crush resistance



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tear resistance



...better
abrasion resistance
and tensile strength



...better
flexing endurance



...better
resistance to kinking



...better
flame and heat resistance

**...resists all your
costliest hazards
far beyond
accepted field
requirements!**

New SUPERTUF, General Cable's lead cured jacket on new SUPER SERVICE eliminates ply separation, resists crushing, tearing and abrasion. Special cord reinforcement within the SUPERTUF jacket gives extra tensile strength and longer cable life. In addition to meeting IPCEA specifications the new lead cured construction provides positive embossed product identification.

THERMAX heat resistant insulation gives top protection against temporary current overloads and extends the operating life of the cable. Flame resistance of the new SUPER SERVICE cable far exceeds requirements of the Federal Bureau of Mines.

New, more compact design prevents sleeving of the core from the jacket. Result: a well balanced product that performs better, lasts a lot longer, needs less replacement...costs no more! Why settle for less? See your friendly General Cable Representative today!

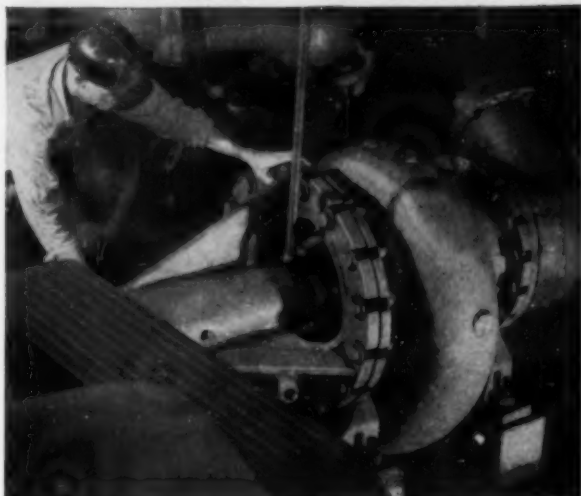


BASE, WEATHERPROOF, INSULATED WIRES
and CABLES FOR EVERY ELECTRICAL PURPOSE

GENERAL CABLE CORPORATION

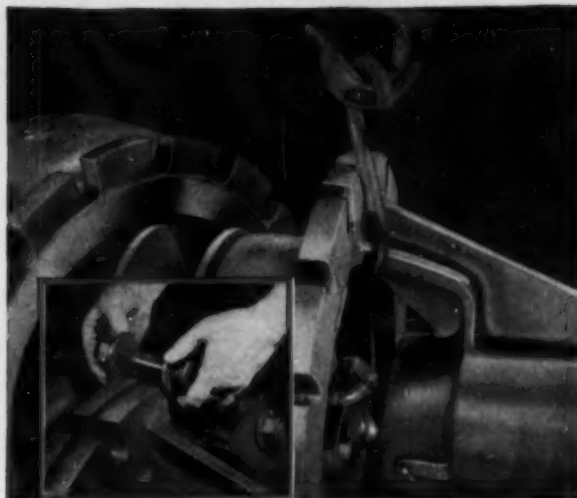
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Here's what we mean by LOW COST MAINTENANCE



1. Troubles are few and far between

One user of Allis-Chalmers coal washing pump says, "We've been operating them for 8 months without loss of capacity." . . . a third said, "We ran it for 13 months before we replaced the first part." These comments are typical. You, too, can get this long-lived performance with A-C pumps.

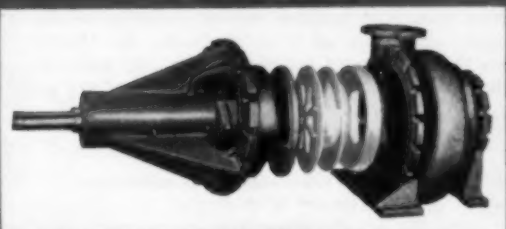


2. Inspection is an easy routine

Takedown and re-assembly require less than half an hour. Merely disconnect the drive . . . loosen the nuts on casing bolts . . . and lift out the bolt assemblies. Then, swing out the rotating element. There's no need to disturb the suction or discharge piping. Maintenance men really go for A-C pumps because inspection is so simple.

Only 5 Wearing Parts

**Two Wear Plates
Impeller • Casing
Shaft Sleeve**



3. Parts replacement is fast, economical

Wear is limited because there are only 5 wearing parts. This, plus the fact that most parts are interchangeable with those of other A-C pumps, means you won't have to carry big spare parts stocks. What's more, because parts replacement is infrequent . . . because it's so fast and simple when necessary . . . you can hold downtime, production interruptions to a minimum.

ALLIS-CHALMERS
Coal Washing
PUMPS

IN addition to sound design, Allis-Chalmers coal washing pumps feature special hard alloy *Ni-Hard* and extra thickness of metal in critical spots. Then, too, each A-C pump is application engineered to meet the specific conditions under which it will be used.

Remember, Allis-Chalmers can furnish the complete pumping unit — pump, motor, control and drive. Next time you need a coal washing pump, call your A-C representative or write — Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 52B6381.

A-4397

ALLIS-CHALMERS





To light Safety Fuse from one point in Secondary Blasting use ENSIGN-BICKFORD

Quarrycord

Now you can use safety fuse and caps in multiple blockhole secondary blasting, with the added features of remote firing.

The lighting device is Quarrycord — a flexible water-resistant cord specially constructed to burn fast, at a speed of about one foot per second, with an external flame at the zone of burning. It is not affected by stray electrical currents, and is ideal for use during the thunderstorm season.

Fuse and caps are prepared in the usual way, with the addition of a connector crimped on the free end of the fuse. This connector protects the fuse powder train during rain storms, and is slotted to provide a firm, positive connection for the Quarrycord.

After the blockholes are loaded, the Quarrycord is run from hole to hole, and inserted into the slot

of each connector. The top of the connector is pressed down over the Quarrycord, locking it firmly in place. The free end of the Quarrycord is then run out to a spot where it can be easily lighted.

Plan your Quarrycord hookup so that the fuse in each blockhole is lighted before the first hole goes. Several groups of boulders can be prepared in this manner, and when all is in readiness, the blaster lights the Quarrycord for each group, and walks to a place of safety.

Q-1

THE ENSIGN-BICKFORD COMPANY

SIMSBURY, CONNECTICUT

Manufacturers of Primacord-Bickford Detonating
Fuse and Safety Fuse

Established 1836

Ensign-Bickford Quarrycord is packed on spools in 500 ft. lengths. See your explosives supplier or write us.

■ ENSIGN-BICKFORD ■

Quarrycord
for Lighting Safety Fuse in Secondary Blasting



DECEMBER, 1954

IVAN A. GIVEN, EDITOR

Home Beginning

TWO RECENT EVENTS, somewhat far apart in distance but not so far in time, might well be worthy of study in the search for markets not only for today but also for tomorrow. On Nov. 8, a school superintendent lit a match searching for a leak and set off a gas explosion at the Allen (Okla.) High School, injuring himself, the principal and 45 pupils. Fortunately, no deaths occurred, but it has not been so far back that similar explosions have run up death tolls of scores of children—for instance, well over 100 in one blast.

Event No. 2 took place Nov. 4 when the West Virginia State Board of Education, incidentally, according to the governor, "overruling the Board of Public Works," voted for natural gas as the fuel for the women's dormitory at Marshall College, Huntington, W. Va. The city is a coalfield gateway and the state is the leading bituminous producer of the country. The ironic part was that in the 6 to 2 vote, five of the six voting for gas were from cities either built on or getting a major part of their livelihood from coal mining. One conclusion that could be drawn is that coal still has a job in its own front yard in convincing people that its product is not only safe but clean, convenient and economical.

Working Railroad

FOUNDED ON COAL, built by helping coal develop, and still sticking to the product that made it what it is—that, in a nut shell, is the story of the Norfolk & Western Ry., the lead feature in this issue of *Coal Age*. Outstanding in the Norfolk & Western picture is the fact that all its motive power—freight, passenger and switching—is fueled with coal. Not only that, Norfolk & Western makes it plain that it expects to continue on coal because it is better, and is backing up that conviction by taking a major part, with Babcock & Wilcox, Westinghouse, Bailey Meter Co. and Baldwin-Lima-Hamilton, in the design and application of a

new coal-fired locomotive—a high-pressure high-temperature unit with turbine-electric drive—which already has shown that it can exceed the high efficiency expected by its backers.

Less spectacular but equally down to earth, Norfolk & Western works at promoting business for coal and particularly for producers on its lines in many ways, including not only freight-rate adjustments but also advertising, promotion of coal-burning equipment sales, and service offices in key centers. On any score, Norfolk & Western rates a hearty salute from coal men.

Sales Too?

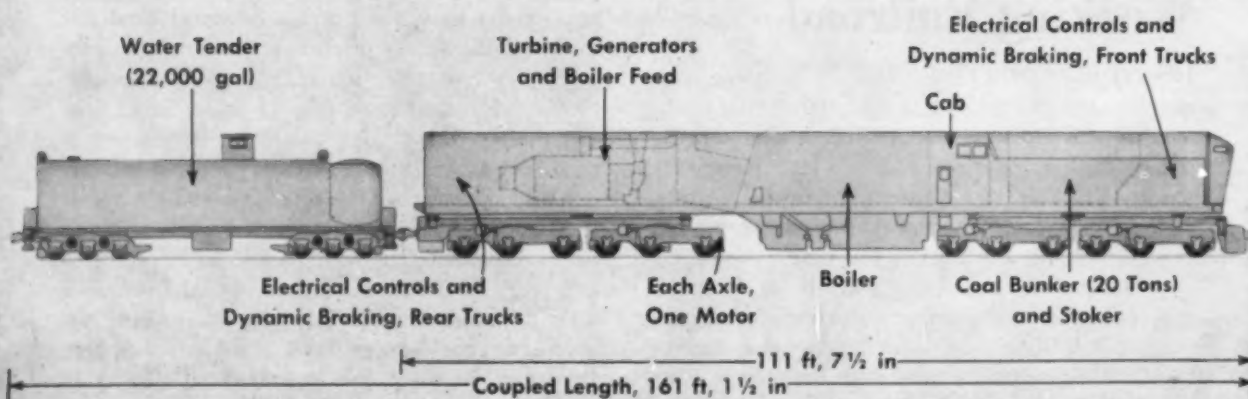
LATE FALL is the heavy meeting time for the coal-mining industry. At least that is the season of greatest concentration, as witnessed by the "Meetings RoundUp" section of this issue of *Coal Age*. In this roundup, *Coal Age* editors report on proceedings at ten association and institute meetings both national and regional in character and involving discussion of practically everything in or affecting coal mining from merchandising through mining and preparation to safety. Incidentally, the ten reports in this issue bring the 1954 *Coal Age* total to twenty-eight.

Though producers and operating men delve into merchandising at certain of their meetings, notably the convention of the National Coal Association, the theme of the great majority is production, preparation, and related problems—with little or nothing on coal sales or coal-selling methods. Perhaps this is as it should be, but there is a small but growing group that argues that production and sales are but two phases of a single operation, and that therefore the two branches should be at least familiar with each other's problems and progress. Thus, each would be better prepared to bring maximum effort to bear on reaching the overriding goal—more sales and more business. Perhaps this group has something in suggesting that more meetings should include sales as well as production.



COAL-FIRED steam-turbine electric freight hauler pulls heavier loads at lower cost over mountain terrain.

Giant new coal burner confirms N&W's faith in coal



SHARP BREAK from traditional arrangement of locomotive reflects N&W's fresh approach in design.

Railroading With Coal

Here's the story of the Norfolk & Western Ry. and coal.

It tells how the railroad . . .

Promotes and develops its richest asset, coal

Makes coal pay off as a locomotive fuel

Helps fuel buyers get best value for their dollars

Boosis itself and coal by spurring regional growth

THE NORFOLK & WESTERN RY. is the Nation's second largest originator of bituminous coal shipments. It also is the only major railroad whose locomotives are 100% coal-fired.

Today, N&W is putting a brand-new coal-fired steam-turbine electric locomotive, the world's largest single-unit freight hauler, through exacting road tests. The new engine is another token of N&W's faith in coal. If it works as well as signs now indicate it will, the new unit eventually may lead to a change in the fuel policies of other railroads.

N&W's loyalty to coal is no attempt to curry favor with coal producers along the railroad's tracks. Its loyalty to coal is based on hard-headed common sense and economics. Coal is the most abundant natural resource along the N&W's right-of-way and its most lucrative source of freight revenue.

And when promoted imaginatively, coal is an attractive lure for energy-using industries that seek new locations—industries whose products provide still more revenues for the railroad that hauls them to market.

For those reasons, as well as others, N&W puts its faith in coal. The railroad hauls a multitude of other kinds of freight—plaster, limestone, tobacco, wheat and wheat products, fertilizer, industrial chemicals, furniture, pulpwood, sodium products, fabricated iron and steel, cement, wallboard, foods and textiles, to mention only a few. But from the days of the first shipment of coal on the N&W in 1883, in which year the line hauled 54,399 tons of bituminous from the rich hills of southwestern Virginia, to the present day, when the line's haul will total over 750 times as much, enlightened self-interest has turned N&W's efforts to the building of

larger markets for coal and the development of better uses for coal.

Spurred and guided by this self-interest, N&W has:

1. Developed locomotives that burn coal cleanly and efficiently at low cost.

2. Promoted, merchandised and advertised coal as a fuel and a raw material.

3. Established coal bureaus in major coal-burning cities, on and off N&W lines, to help customers get better value for their fuel dollars.

4. Played a strong, progressive role in the industrial growth of its region.

Better Locomotives

THE NEW COAL-BURNING steam-turbine electric locomotive, admirably dubbed "Jawn Henry" after the legendary hero of railroading men, caps years of sustained research and development by N&W directed at better engine performance, as well as better maintenance terminals and equipment and improved coal-handling and storage facilities. The payoff shows up in the record from 1923 to 1951, in which period N&W effected a 51% cut in number of locomotives and a 35% cut in coal consumption while increasing gross ton-miles by 45%.

From 1928 until "Jawn Henry" left the Baldwin-Lima-Hamilton shops at Philadelphia and rolled onto N&W's tracks at Hagerstown, Md., in May, 1954, N&W itself had built all its locomotives except for 30 switchers that were bought from another railroad several years ago. With locomotive design and construction confined to its own backyard and thus kept under close day-to-day control, N&W has been in position to tailor motive-power units to its own peculiar needs

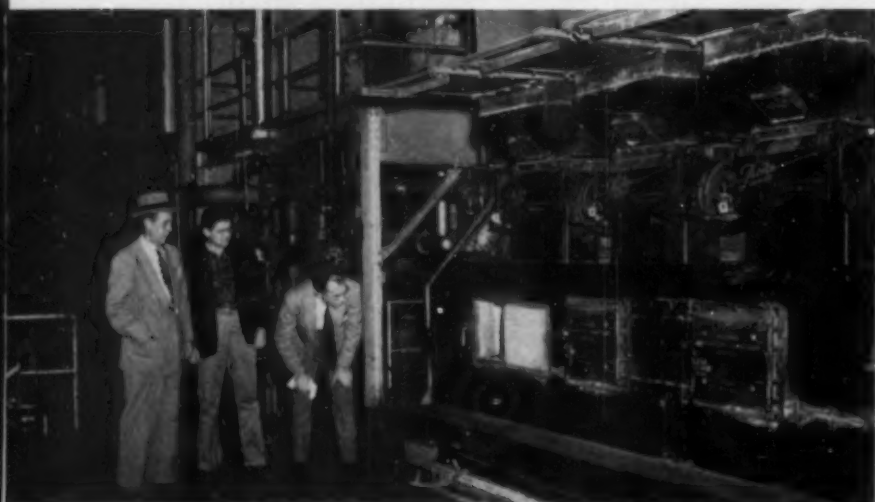
These Facts Show Why N&W Sticks to Coal

	Freight Service Only		Per Cent Favorable Change
	1940	1953	
Million gross-ton miles of freight hauled . . .	30,178.5	32,252.9	6.9
Average number of freight locomotives serviceable	281	223	20.6
Average tractive effort per locomotive owned at end of year, pounds	88,882	107,650	21.1
Million tractive-power miles per average number of locomotives serviceable	3,344.0	4,967.5	48.5
Gross ton-miles per train-hour	57,984	71,991	24.2
Pounds of coal used per 1,000 gross ton-miles	99.1	92.1	7.1
Miles between shoppings for Class IV or heavier repairs*	55,427	150,887	190.3

*For all locomotives in all types of service.



OUTSIDE SERVICE—N&W's precision transportation delivers coal when and where customers want it.



INSIDE SERVICE—Coal users learn better burning methods from N&W coal-bureau men, like R. L. Hawkins (left).

and, with minimum delay and trouble, to add new features to in-service units as new features were developed.

Today, therefore, N&W's fleet of road-service iron workhorses benefits from years of accumulated experience in building more efficient locomotives and locomotive components. Each engine is built on a one-piece cast-steel frame, thus eliminating bolts and rivets, and the drivers are counter-balanced to ease wear on the track. Drivers, trucks and tender wheels are equipped with roller bearings, and mechanical and pressure lubrication automatically serves from 191 to 227 points.

These improved conventional steamers are rugged, powerful, efficient performers. Initial cost and maintenance are low and availability is high. N&W officials point out that their modern locomotives, compared with engines built 25 yr ago, use

about 23% less coal per 1,000 gross ton-miles of traffic handled and cost from 20 to over 35% less to maintain. Their only fuel is coal, readily available along much of the railroad's trackage.

N&W locomotives now in road service are of three major types, as follows:

1. Class J, streamlined passenger hauler—Built to handle heavy passenger trains over rough mountain grades, these trim giants have recorded speeds in excess of 100 mph where grades and curves permit such speeds. Lightweight driving rods and reciprocating parts ease the pounding that steam locomotives usually deliver to the track. These locomotives have an assignment of approximately 15,000 mi per month per locomotive. After they were built, they accumulated an average of 238,000 mi per locomotive before being run into the

Roanoke shops for classified repairs. Capacity of the mechanical lubricating system permits 1,300 mi of running without replenishment. Wheel arrangement is 4-8-4.

Further specifications are:

Tractive effort	80,000 lb
Boiler pressure	300 psi
Length, engine and tender	109 ft, 2 1/4 in
Weight on driving wheels	288,000 lb
Coal capacity, tender	35 tons
Water capacity, tender	20,000 gal

2. Class A, freight and heavy passenger hauler—This versatile, single-expansion, articulated locomotive is used for routine freight service in some districts, fast freight service in other districts and heavy passenger train service nearly anywhere on the railroad's lines. In passenger service, the unit can produce sustained speeds above 70 mph. Sustained drawbar horsepower of 5,300 at 45 mph is common for this locomotive. At full power, it burns 7 tph of coal. Wheel arrangement is 2-6-6-4.

Further specifications are:

Tractive effort	114,000 lb
Boiler pressure	300 psi
Length, engine and tender	121 ft, 9 1/4 in
Weight on driving wheels	432,350 lb
Coal capacity, tender	30 tons
Water capacity, tender	22,000 gal

3. Class Y6, heavy freight hauler—This compound Mallet-type steamer does fast and routine freight service in mountain country. It reaches top speeds of 45 to 50 mph where grades and curves permit. Wheel arrangement is 2-8-8-2.

Further specifications are:

Tractive effort:	
Simple	170,00 lb
Compound	132,000 lb
Boiler pressure	300 psi
Length, engine and tender	114 ft, 10 1/2 in
Weight on driving wheels	548,485 lb
Coal capacity, tender	30 tons
Water capacity, tender	22,000 gal

How "Jawn Henry" Works for N&W

"JAWN HENRY," LATEST ADDITION to N&W's powerful locomotive fleet, is also the world's largest single-unit locomotive. It is rated at 4,500 hp and designed for top speeds of 60 mph. On a test basis, it now is hauling heavy freight—mostly coal—on the railroad's lines west of Roa-

noke, Va. Its performance from June to the end of this year will determine whether N&W's management finally decides to buy it. Today, when asked how "Jawn Henry" is doing under test, officials smile approvingly.

Locomotive 2300, as the big iron horse is more formally known, is the fruit of a project started 5 yr ago, when N&W officials began looking for a rugged unit having the flexibility of electric drive and a thermal efficiency that would pare motive-power costs. They also wanted the smooth torque and high tractive effort that go with turbine-electric operation, plus dynamic braking and high freight capacity. The locomotive, they insisted, must burn coal. The result of their search, produced by the combined skills of the N&W, Baldwin-Lima-Hamilton Corp., Westinghouse Electric Corp. and Babcock & Wilcox, is a big coal-fired electric plant slimmed down to a width of 10 ft.

From front to back, the 2300 houses electrical controls and dynamic braking equipment for the forward trucks; the coal bunker and stoker; the cab for engineer and fireman; the turbine and boiler feed equipment; the generators; and electrical controls and dynamic braking for the rear trucks.

Major specifications are:

Maximum tractive effort	..175,000 lb
Continuous tractive effort	
at 9 mph	.....144,000 lb
Boiler pressure	.....600 psi
Steam temperature	.....900 F
Length, engine and	
tender	.....161 ft, 1½ in
Weight, locomotive and tender	
with coal and water	...1,182,000 lb
Coal capacity	.....20 tons
Water capacity, tender	...22,000 gal

Something Old, Something New—

Though breaking sharply from predecessor and contemporary locomotives, "Jawn Henry" holds fast to much that is old. His old-fashioned steam whistle will echo among the West Virginia mountains, over the hills of Virginia and Ohio and across the Great Dismal Swamp approaching Norfolk. His air compressors also are steam-driven. His stoker, somewhat improved over earlier models, is nevertheless conventional locomotive equipment. His trucks, including traction motors, are from diesel-locomotive production lines. And the generators and the electrical controls are familiar features in electric traction.

But "Jawn Henry" is new and different, too. He differs from three earlier steam-turbine locomotives. One, tried out in 1936, burned oil and was retired because of trouble with con-

densers. "Jawn Henry" has no condensers. Another, put on the rails in 1944, was withdrawn after 100,000 mi because, among other things, its low-pressure boiler was not thermally efficient. "Jawn Henry's" boiler runs at high pressure. A third was abandoned because of troubles with its low-pressure boiler and poor fuel utilization.

"Jawn Henry" is the longest locomotive anywhere around—nearly 40 ft longer than N&W's Class A locomotive. He is too long, in fact, for turntables now in service. But when no "Y" is close by for turning, the locomotive can be disconnected from the tender, turned, and then coupled to water connections at the tender's back end, because the tender is equipped to operate at either end. In spite of his great length, "Jawn Henry," with his power plant supported on the locomotive frame at only three points, can negotiate N&W's rough terrain and the curves that go with it.

Measuring Performance—Tests of the big 2300 are not yet complete. But some performance data have begun to shape up. Compare the 2300, for example, with N&W's Y6 compound Mallet freight hauler. Present assignment of the Y6 is 3,000 tons westbound from Roanoke (empty movement) and 10,300 tons eastbound (loaded movement), with a pusher added over Alleghany Mountain. The 2300, however, can handle 4,000 tons westbound and 13,000 tons eastbound. In mountainous districts, the 2300's speed was 4 to 13% lower than that of the Y6 while handling the same tonnage but its fuel saving ranged from 20 to 30%. With higher tonnages, speed was 13% less and actual coal consumption was 12 to 20% less, while fuel burned per gross ton-mile was from 19 to 37% less, depending upon the terrain of the district. As of Sept. 21, by which time the 2300 had accumulated 12,800 mi, it was clear that the new locomotive works most economically and efficiently when running at full capacity. On level terrain, the 2300's speed is some 15% less than that of the Class A engine, but fuel saving runs to 25%.

Experience with the 2300's boiler shows that it makes adequate steam for maximum demands and that it operates with a clear stack at all demand levels. Though there have been some failures, they were minor and were corrected without great expense or trouble.

As pointed out, the big locomotive still is under observation and test. But it is performing satisfactorily, to say

the least, and measuring up to specifications laid down in advance. Thermal efficiency, for example, is in the order of 12% at the generator terminals and about 11% at the rails.

The 2300 thus begins to shape up as a challenge to the diesel's newly-won supremacy. That, at any rate, is what N&W officials are hoping for. If they are right—and it's an odds-on bet they are right—"Jawn Henry" will become the new champ, another landmark in N&W's development of better transportation and better ways to use coal.

Helps in Selling Coal

HELPING COAL USERS get the best value for their money is the task of N&W's eight coal bureaus, headed by the Coal Traffic Dept. at Roanoke, Va.

These bureaus grew out of the railroad's conviction that it should provide something more than transportation; namely, a service that would help coal producers along the line by helping coal users get better results from their fuel. This conviction led, beginning in 1929, to the establishment of five off-line coal bureaus—at Chicago, Detroit, Cleveland, Boston and St. Louis—and three on-line bureaus—at Roanoke, Winston-Salem and Cincinnati.

Those eight bureaus still are flourishing today, rendering an indispensable service to the railroad and its clients. From the beginning, they have been manned by fuel engineers and experts in coal selection, coal utilization and railroading. In the 20's, when coal stokers first began to appear on the domestic heating-equipment market, N&W tested a wide variety of units and thus provided its bureaus and stoker manufacturers with useful information for householders and manufacturers who burned coal in their plants. Today, when the shift in industry is toward powdered coal, N&W coal-bureau men are helping to solve coal-burning problems that are equally puzzling and urgent.

Today, as when the bureaus first were set up, N&W field men know the facts about the coals produced along the railroad's lines. With this knowledge, their job is to see that each coal is burned in the way that best capitalizes on its merits. That's why they are welcomed by retailers, office-building managers, power-plant superintendents, factory managers and supervisors, householders, and responsible men at kilns and smelters. In effect, they are the middlemen between coal producers and customers for exchange of complaints, compli-

Here's How N&W's New Freight Hauler Works

TAKE A QUICK LOOK at the major components of N&W's 2300, the new coal-burning steam-turbine electric locomotive that's admirably called "Jawn Henry."

Feedwater System—A cold-water pump moves feedwater from the tender through a water softener installed on the tender, then through a turbine oil cooler and into a de-aerating heater, whence a booster pump delivers it to the main feed pump. The main pump discharges it to an economizer, where it picks up more heat, and then to the boiler drum. Sodium sulphite is fed automatically in proportion to steam flow. An emergency pump can deliver cold water directly from tender to economizer.

Boiler—Babcock & Wilcox has designed and built a natural-circulation water-tube boiler capable of 640 psi, about twice conventional locomotive-boiler pressure. Steam is delivered at 900 F, some 200 deg higher than usual. High pressure and high heat, combined with turbine-electric drive, provide a theoretical efficiency approximately one and one-half times that of reciprocating steam locomotives. Steam-generating tubes, 3 and 2½ in in size, connect the longitudinal drum and bottom circulating headers. Cyclone separators remove moisture from the steam before it enters a bank of 1-in superheater tubes. Combustion air for the firebox is forced in under pressure by a turbine-driven blower through a gas-air

preheater, where its temperature is raised to 350 F before it goes to the furnace chamber. Stack jets provide an induced air flow when the boiler is firing up. Blower-turbine exhaust steam goes to the feedwater heater.

Boiler Controls—Four Bailey Meter Co. pneumatic controllers mounted in the operator's cab measure and govern steam pressure, steam and air flow and drum water level. Fuel and air selector valves are installed at the fireman's panel in the cab; the feedwater selector valve, at the engineer's panel. Each selector valve can be turned to automatic or manual operation. In automatic position, pneumatic interlocks stop the coal feed when water is low or air flow is interrupted. In manual position, the interlocks are cut out and the controls work like those on a conventional locomotive. If water rises too high or falls too low, an alarm sounds automatically in the cab. On automatic or manual, an interlock stops the main feed pumps if water rises too high.

Coal and Coal-Handling—The 2300 is designed to burn run-of-mine as well as stoker coal. Thus far, on test runs, ¾x2-in coal has been used, with typical size consist running as follows: plus 2-in, 0.54%; 1¾x2-in, 5.49%; 1¼x1¾-in, 20.87%; ¾x1¼, 34.04%; ½x¾-in, 16.48%; minus ½-in, 23.12%. Typical analysis runs to 3.56% moisture, 37.58% volatile, 56.02% fixed carbon, 6.4% ash and 13,975 Btu (dry basis). The 20 tons of

ments and up-to-date information.

N&W contributes another direct though long-range help to the sale of coal. This contribution takes shape in the railroad's participation in coal utilization research and coal's public-relations activities. N&W is a member and supporter of Bituminous Coal Research, Inc., and shares in the planning and development work of BCR's Locomotive Development Committee, which expects soon to produce a coal-fired gas-turbine electric locomotive. In addition, N&W is an active member of the Coal Producers' Committee for Smoke Abatement and the Fuels Research Council, the latter being coal's major champion in the fight against uneconomic uses of natural gas. N&W officials have served on important committees and as directors on all of these organizations.

Merchandising Coal

IT TAKES BUSY FREIGHT TRAINS to keep a railroad going these days. That's why N&W devotes imagination, time and money to promote and advertise coal, the railroad's prime source of revenue and the most abundant raw material in N&W territory. N&W aims extensive coal advertising at the coal user as well as the retail coal merchant.

Where merchants are the target,

advertising stresses the theme of fuel satisfaction inherent in coals produced along N&W lines, plus precision railroad transportation. These ads are published in eight business magazines serving the retail-merchant industry. Advance proofs of ads are mailed out to N&W coal representatives in the field, who thus can gear their sales pitch to the railroad's current emphasis. Some of these ads feature the men in N&W coal bureaus, together with sales and service personnel in various territories, thus building stature for the men who deal directly with customers.

Where fuel customers are the target, N&W ads build up the theme of fuel satisfaction. The railroad runs these ads six times per year in 85 metropolitan newspapers in major coal-consuming areas east of the Mississippi and along N&W lines. Proofs are sent out 2 wk in advance to newspaper advertising managers and N&W coal-bureau heads, who suggest to local coal merchants that they tie in their own ads with N&W ads on the same date. Local merchants often are grateful for this opportunity to add power to their own advertising.

Believing that whatever reflects well on the railroad also reflects well on the coals along its lines, N&W supports a regular program of institutional advertising, taking 6-column,

15-in ads monthly in 122 daily and weekly newspapers along N&W lines, with total circulation of some 25,000,000. This program tells how N&W acts as citizen, taxpayer, employer, guardian of public safety and developer of the region.

But advertising is not N&W's sole effort in coal merchandising. Its handsome color booklet entitled "The Story of Fuel Satisfaction," telling how coal was formed, how it has shared in the Nation's growth, how it is mined and prepared for market, how it is distributed and how to burn it for best results, has been distributed widely among coal merchants and fuel buyers, schools and chambers of commerce. Another booklet, carrying a complete list of coal and coke operations along N&W lines, together with names of mine operating companies with addresses, billing stations and selling agents, and a complete colored map of its coal fields, is updated periodically and distributed to coal buyers, industrial plants and coal merchants. In a program to reassure customers overseas as well as in the United States, N&W has issued a booklet entitled "Accurate Weights," now published in English, Italian, German and French, showing step-by-step precautions the railroad takes to give customers correct weights.

coal carried in the bunker is enough for 100 mi or more, or about the distance between any two division terminal points on the N&W lines.

An improved screw-feed locomotive-type stoker, equipped with steam-jet spreader, delivers coal from the hopper in the locomotive nose. The travelling grate moving about 10 fpm, discharges ash continuously at the feed end. Steam jets at the firing end of the ash pan blow the ash back and distribute it over the entire pan. Because the firebox is pressurized, the pan must retain all the ash produced in a complete trip. Stack discharge and carbon losses are low.

Power Plant—An impulse-type non-condensing steam turbine—built, like the rest of the plant, by Westinghouse—delivers 4,500 hp at 8,000 rpm to the generator for traction. The turbine drives the generators through an 8.9 to 1 single-helical reduction gear. The generators are mounted on a single shaft, with each armature connected to two parallel groups of three series-connected traction motors. The turbine is mounted on the reduction-gear housing, which is rigidly attached to the generator stator. The gear housing also contains the lubricating-oil reservoir. Thus made into a single self-contained unit, the power plant is supported on the locomotive frame only at three points, with the result that alignment is not affected by frame distortions.

Turbine Controls—The turbine stop valve can be opened or closed by means of a turnwheel on a flexible shaft in the cab. In an emergency, the engineer can

stop the turbine by operating a push-pull trip lever.

Running Gear—Wheel arrangement is 6-6-6-6. Each axle has one motor. At each end of the locomotive, two swivel-type motor trucks are spanned by a bolster. The front-span bolster carries the cast-steel pilot, or "cow-catcher," and a swing-type coupler. Traction and buff loads are carried through the body center pin to the side trusses and the rear center pin. The rear-span bolster carries rubber draft gear and a Tightlock coupler, as well as cold and emergency feedwater pumps.

Brakes and Sand—Dynamic braking effort ranges from 35,000 lb at 50 mph to 130,000 lb at 14 mph. The air-brake equipment is located under the engineer's cab, with air pumps and reservoirs beneath the coal-bunker side-slope sheets. Fans for ventilating the dynamic-braking resistors are driven by motors connected across the resistors. Sand boxes are installed beside the coal bunker, up front, and in the turbine and generator compartments. Each truck is sanded back and front.

Cab and Controls—The cab is built and the controls are located with operator comfort and train safety foremost in mind. The cab and its equipment are supported by two side trusses, with cross-ties for box strength. All manual controls are within easy reach of the engineer and fireman, respectively. The master controller, equipped with throttle and reverse lever and marked by 12 notches in addition to "Off" and "Idle" positions, actuates the turbine speed changer and controls excitation of the main generators.

Films also play a strong hand in N&W's promotion of coal. "Power Behind the Nation," a color motion picture produced in 1940 and updated in 1952, has been viewed by some 5,000,000 people, not counting those who have seen it on television. Two other films, "The Modern Coal Burning Steam Locomotive" and "Operation Fast Freight," have done much to promote coal and N&W services everywhere they have been shown.

The above by no means exhausts the list of N&W's campaigns to merchandise the railroad's services and the coals along its lines. Booklets, folders, pictures, blotters and other materials go by direct mail to thousands of people, industries and institutions. The railroad stages displays at conventions and meetings. N&W men make speeches before civic clubs and professional and business groups. And trained journalists prepare articles and news stories about the railroad and the resources along its lines for magazines and newspapers.

Building More Business

THE DESTINY OF A RAILROAD is shaped by the development of the region it serves. That's why N&W always has encouraged established industries along its lines to expand and

has sought to draw new industries into the region.

How can a railroad help in the growth of a region?

N&W for many years has maintained an Industrial & Agricultural Department to spur regional growth. That department relies on the resources that abound along the railroad's lines. Rich assets lie along N&W's 1,133 mi of heavy track, sidings and spurs. Leading the list are the coal fields of southern West Virginia, southwestern Virginia and eastern Kentucky, with their boundless reserves of various kinds and qualities of coal for fuel and raw material, plus modern, well-equipped mines and preparation plants. Electric power is plentiful and cheap, for the region is served by such utilities, to mention only a few, as Virginia Electric Power Co., Potomac Edison Co., Columbus & Southern Ohio Electric Co., Duke Power Co., Appalachian Electric Power Co., Cincinnati Gas & Electric Co. and Ohio Power Co. Limestone is plentiful for road-building, cement-making, chemical and other uses. Transportation is unexcelled, for N&W has interconnections with such major carriers as Atlantic Coast Line, Seaboard Air Line, Southern, Louisville & Nashville, Chesapeake & Ohio, Baltimore & Ohio, Pennsylvania and New York Central. The region's fer-

tile lands yield a wide variety of farm and dairy products. Finally, the region's human resources provide an intelligent, stable and productive labor supply for many industries.

N&W's regional development campaign has paid off well. From 1944 through 1953, for example, the railroad recorded 2,384 new and enlarged plants along its own and tributary lines. Others may have escaped notice. The known plants, however, add up to a total investment of \$2,436,000,000, including \$1,200,000,000 for the Atomic Energy Commission's power plant at Portsmouth, Ohio, and new job opportunities for 197,471 people. These plants belong to such diverse industries as textiles, pulp and paper, furniture, chemicals, light electrical equipment, warehousing, stone-clay-and-glass, apparel, tobacco and food.

Needless to say, N&W encourages all these plants to burn coal. One result shows up this way: Though bituminous production in the United States in the first 7 mo of 1954 was 18.9% below output in the same period in 1953, production along N&W lines was off only 13.4%. This indicates not only the fine quality of the coals along the railroad's tracks, but also the solid, constructive promotion and development that N&W, in its own self-interest, has given to coal.



"We always have tried to enhance the company's competitive position by applying progressive ideas and maintaining good employee relations. And we always have tried to keep one step ahead of our competitors when new equipment was introduced. We know that in the future we'll have to continue to do it if we want to keep one step ahead."

... Says Frank E. Williams (left), Pecks Run founder and president, in summing up company policy. Frank, Jr. (right), secretary-treasurer, is other member of father-and-son team behind the firm.

"Keeping Up With the Times"

How Pecks Run Coal, mining 1,000 tpd, keeps pace with market requirements by effectively combining progressive ideas, good management-employee teamwork, latest equipment and modern mine design for continuous mining.

By A. E. FLOWERS
Associate Editor, COAL AGE

UP TO 500 TONS PER SHIFT with a continuous miner operating in 56-in coal, a maintenance program that has resulted in 8 yr of operation with off-track equipment without an armature failure (see p 60), and excellent teamwork between management and labor are among the top achievements of the Pecks Run Coal Co., Buckhannon, W. Va.

MINING PROGRESS

Pecks Run was organized in 1917 by Frank E. Williams, president, who opened Kano No. 1 mine as a pick-mining operation with mule haulage. Four years later, in 1921, shortwall cutting machines were added as the first step in a continuing program of modernization with new equipment and methods. Coal was machine-cut, hand-loaded and hauled by mules

until 1938, when a Jeffrey 44D track-mounted loader and trolley locomotive were purchased. In 1942, Cardox was added to break coal and in 1943 a Goodman 360 loader was purchased. Modernization continued in 1944, when all-steel Differential 8-ton mine cars were purchased and a rotary dump, 90-ton bin and other tipples changes were completed. A large shop and supply building were built in 1946 to permit all maintenance to be done at the mine.

A major step in modernization was made in 1948 when off-track mining equipment, including a Joy 14-BU loader, 10-RU cutter, CD-25 drill and 5-SC shuttle cars, was purchased to replace the track-mounted units. Two years later a Jeffrey 52B belt conveyor equipped with Goodyear Coal Flow belt was added to handle coal haulage in room panels. To improve the main-haulage system, a 17-ton Jeffrey locomotive was added in 1951. The following year, a second off-track

loading unit was purchased for mining pillars in isolated areas. This pillar unit consists of a Joy 8-BU loader, Lee Norse shuttle car, Chicago Pneumatic 572 drill and Sullivan 7B cutter mounted on a Joy T-2 truck.

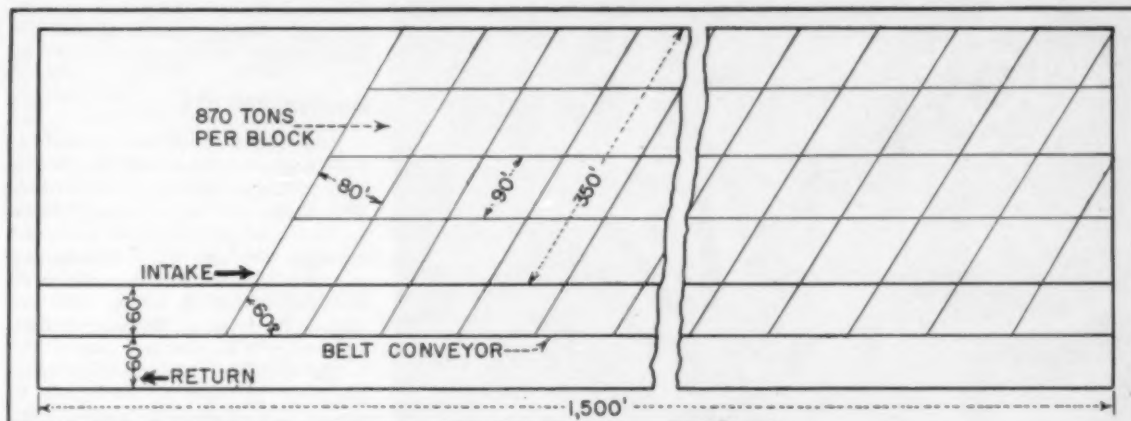
A Jeffrey Colmol, which went into service in 1954, is the latest addition in the continuing program of adding new equipment to cut cost. The new unit produces an average of 400 tons per shift in selective mining. In addition to high output per man-shift, the selective mining program has resulted in a reduction in ash from 8.7% to 7.0%, and an increase in heating value from 13,300 to 13,600 Btu.

MINING METHODS

Pecks Run is now working its sixth opening in the Redstone seam, which ranges from 50 to 72 in in thickness. The immediate roof is firm shale, which ranges from 6 in to 30 ft in thickness. Sandstone, ranging from 50



CONTINUOUS MINER produces an average of 400 tons per shift while maintaining top quality. Miner product has 1.3% less ash and 300 more Btu's than coal produced with conventional equipment.

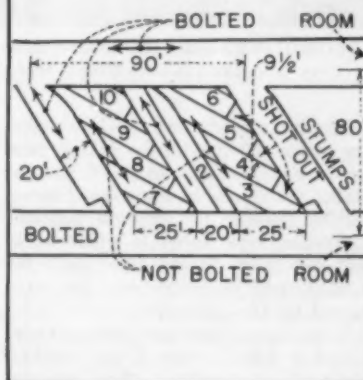


HOW PECKS RUN MINE IS LAID OUT for efficient continuous mining with full pillar extraction. Earlier block system was revised when miner was added.

to 100 ft in thickness, overlies the shale where the cover is thick. Total cover varies from 15 to 250 ft. The coal has a medium-hard structure with definite face and butt cleats and is underlain by a very hard shale. Impurities in the form of sulphur balls and clay veins sometimes are encountered in the seam, which dips uniformly $1\frac{3}{4}\%$ to the northwest.

As new equipment was added, mining projections were changed to permit equipment to operate at maximum efficiency. The original two-heading system was expanded to a five-head-

ing system when mechanical loading was introduced. Rooms were driven off one side of the entry and pillars were extracted. This system later was changed to a block system, which also was revised when the Colmol was added. The continuous-mining plan consists of a three-heading entry with rooms driven 60 deg with the entry to facilitate equipment movement. Room pillars are on 80x90-ft centers and each block contains about 870 tons of coal, which is extracted in two working shifts. Details of the mining plan are shown above.





SHUTTLE CARS AND 30-IN BELT CONVEYOR serve as intermediate haulage units to carry coal between continuous miner and mainline rail-haulage system.



LOCOMOTIVES and 8-ton all-steel mine cars in trips of 9 or 11 cars are teamed in loop haulage for efficient transportation to tippie 3 mi from face.

Headings, rooms and breakthroughs are driven 20 ft wide by taking two passes with the Colmol. Roof is supported with bolts in the weaker areas and by posts in the stronger regions. Extraction is so rapid in pillar work that the roof doesn't have time to weaken and therefore can be supported by straight posts.

The continuous-miner unit is made up of a Jeffrey Colmol, Joy 14-BU pickup loader and two 5-SC shuttle

cars. Section personnel includes a continuous-miner operator, pickup-loader operator, two shuttle-car operators, one wireman, two timbermen, and one mechanic; a total of eight.

Service personnel includes two motormen who handle coal trips between the belt discharge and the tippie; a day-shift belt man who also relieves machine operators during the lunch period; two trackmen; and one general maintenance man. On the

night shift, a ventilation and drainage man is used in place of the belt man. Four men operate the tippie on the first and second shifts.

On the third shift, a 6-man crew uses the off-track equipment to work areas which do not lend themselves to high-tonnage output or were developed with off-track equipment and, therefore, do not lend themselves to continuous-mining methods. Rock-dusting and supplying are handled on this shift by a 2-man crew. Two men do underground maintenance and two handle slate disposal and car cleaning at the tippie.

Shuttle cars serving the continuous miner carry coal to a Jeffrey 52B 30-in belt conveyor in the middle heading of the panel entry. The belt feeds to a Joy elevating conveyor and coal is discharged into 8-ton mine cars which are handled at the loading point by a Nolan car spotter. Loaded cars are hauled to the tippie in 11-car trips by the Jeffrey 17-ton unit and in 9-car groups by a Westinghouse 908 locomotive. While one trip is being loaded the other is making the round trip to the tippie.

The main haulage is made up of better than 1 mi of 85-lb Thermit-welded rail on 5x7 ties ballasted with rock, and 2 mi of 60-lb rail also on 5x7 ties. Average grade against the loads is 1¼% and the maximum is 3%.

MINING RESULTS

Total output from the 2-shift continuous-miner setup and the single-shift pillar-recovery unit is 1,000 tpd. The continuous miner has produced as much as 500 tons per shift and averages 400 tons while maintaining top coal quality. When reduced to tons per man-shift at the face, including the foreman, that output averages out to 44.4 tons per man.

The Colmol has a sound-powered telephone installed on each side to permit communication between the operator and an observer on the opposite side while the machine is running. Thus the machine need not be shut down to tell the operator when the miner is cutting the roof or bottom. And output is correspondingly increased.

Management emphasizes that consistently high continuous-miner output and the success of the maintenance program are, in large part, the result of the close relationship that exists between labor and management. And labor is credited with having made a major contribution to the development of the company.

"The caliber of the men is such that we never have had to go outside of the company to get foremen, machine



PREPARATION is centered in all-steel building where coal is hand-picked, crushed and sized before loading. Coal quality is checked regularly, with a float-sink test made on each shift.

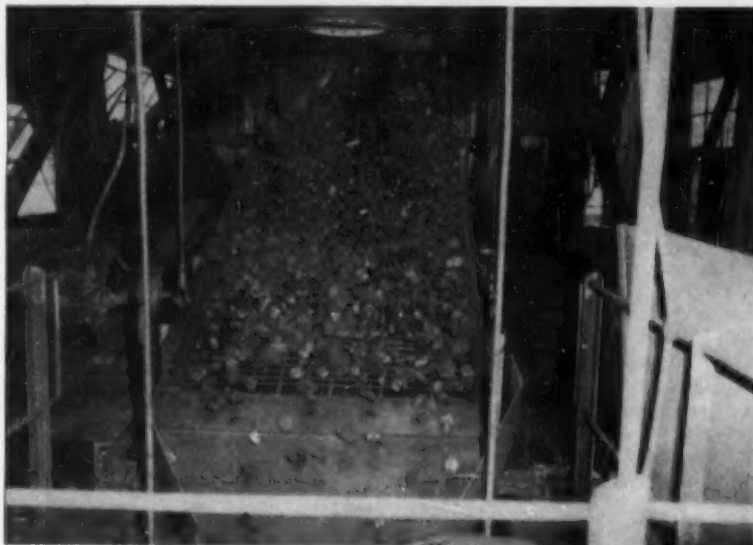
operators or mechanics. Some of the men who started with the company in 1917 are still with us. Many others have many years of service and have worked at no other mine," Frank William Sr. notes in paying tribute to the men working for him.

Neither Mr. Williams nor Frank, Jr., are swivel-chair executives who give orders from behind a polished desk. They enjoy seeing things first-hand and know all the men by their first names. Frank, Jr., who grew up with the company, is known to the men as "Bud" Williams. Both are graduates of Penn State in mining engineering and are registered professional engineers in West Virginia.

COAL PREPARATION

Raw coal flows from the 90-ton bin to a grizzly equipped with two Syntron vibrators and is separated into plus 1½ and 1½x0 products. The larger size is delivered to a 48-in belt and hand-picked by two men, while the 1½x0 is delivered to a 30-in belt leading to the sizing and loading section of the plant. The hand-picked product is directed to a McLanahan & Stone 24x30 single-roll crusher, after which it is mixed with the 1½x0 and carried to the sizing section. A 5x12 double-deck Ripl-Flow vibrator then separates the coal into sizes according to customers' needs before it is delivered to the railroad cars.

The cleaning plant was designed and built through the co-operation of



SIZING VIBRATOR receives coal from belt conveyor and separates it into three products for railroad cars according to customer's needs.

Pecks Run and the Industrial Engineering & Construction Co., Fairmont, W. Va.

Samples of all sizes of coal are sent to the Hyma Laboratories, Buckhannon, W. Va., once each week for analysis. On each working shift, a composite sample of ¾x0 is made, the 10Mx0 is screened out and a float-sink test is made on the remainder. By visual inspection of the sink mate-

rial, management is able to determine the source of the waste and take appropriate corrective steps. Since the Colmol has been in operation, there has been no draw rock to handle and the high-ash coal at the bottom of the seam is left in place. Management points out that the continuous miner has been able to produce an average of 400 tons per shift while handling the selective mining job.



"GOOD VOLTAGE at the motor terminals; thorough, regular, systematic lubrication; and skilled mechanics and machine operators who are machinery sensitive, are the foundations for effective preventive maintenance.

"If we find a part or assembly that gives recurring trouble, we try to make design changes to eliminate it. If changes can't be made, then we try to devise a test that can be used by maintenance inspectors to locate weaknesses before we have a failure."

... Says Frank E. Williams Jr. (left), secretary-treasurer, Pecks Run Coal Co., in outlining his program.

Pecks Run's Nine Steps For Successful Maintenance

TWO OUTSTANDING EXAMPLES typify the effectiveness of the maintenance program carried on by the Pecks Run Coal Co., Buckhannon, W. Va. The record shows that: (1) some of the original parts in shuttle-car wheel units and speed reducers still are in use after 6 yr service; and (2) there never has been an armature failure on any underground face unit.

Further evidence that the maintenance program is paying off was brought forth during the 1953 miners' vacation period when a shuttle car was brought to the shop for overhauling and a Joy 14-BU loader was brought out for a periodic thorough inspection. Since no work had been done on the electric motors since the loader and shuttle car were purchased in 1948, management decided to send the seven motors to the Westinghouse maintenance shop in Fairmont for inspection and repairs necessary to put them in perfect condition. Westinghouse experts found that the only work required was undercutting the mica and some commutator turning. The original brushes were in such good condition that they were not replaced.

How does Pecks Run get these results? The answer is not difficult when one goes through the following nine-point program in effect at the mine.

1. Since lubrication is a vital part of the maintenance program, accurate

records are kept for each machine. A box containing a tally device for each machine is kept in the shop and each time a machine is lubricated, it is recorded at the end of the shift. Recordings are logged and after a specified number of shifts, motor bearings are greased.

2. Equipment is lubricated on the third shift when it is not producing coal and therefore can be given a thorough inspection as it is greased. Clean lubricants are pumped directly from 100-lb drums by an electric grease gun. Thus contamination and spillage of grease are eliminated. The grease drum and electric gun are stored near the end of the panel belt conveyor and equipment is trammed there for greasing.

3. All underground equipment is brought to the shop once each year for inspection and repair. A Phillips carrier is used to haul all equipment except the Colmol, which is carried on a special unit built in the company shop.

To permit thorough inspection in the shop, equipment is blocked up to a height where work can be performed near eye level. It is thoroughly cleaned with steam, after which the frame is examined for cracks or weak points. The maintenance work consists of replacing all bushings, welding worn or weak sections of the frame, rewiring panel boards and re-

placing all other wires. All rewiring is done according to manufacturer's specifications.

4. To keep down time a minimum, a group of key unit assemblies is kept in the shop in event of breakdown. Shuttle-car wheel units, foot switches and panel boards are included in the group, which are rebuilt according to manufacturer's standards. In addition to reducing down time, the spare assemblies permit repair work to be handled in the shop where better tools and facilities are available.

5. An equipment inspector, who is both a skilled mechanic and operator, examines and runs each piece of equipment sometime during the day shift to detect any weaknesses which might cause trouble. If small repairs are needed, he handles them himself and gets help from the machine operator if necessary. But if major work is needed to prevent a breakdown, it is done on the third shift, using unit assemblies as much as possible.

6. Each machine operator is encouraged to take an interest in his equipment and is given an opportunity to help maintain it on an idle day if maintenance is needed. He also carries a set of small tools at all times and is given the authority to stop his machine and fix it if work is needed to prevent a breakdown. As a result, machine operators have



TEAMWORK between mechanic and operator keeps machines rolling. Volt-ohmmeter and diagram are aids.



AUDIO-AMPLIFIER permits maintenance men to detect bearing weakness before it falls and causes a breakdown.

"Never an Armature Failure on an Underground Face Unit!"

been developed into skilled workers who can perform most of the work.

7. Electrical instruments are used effectively to detect trouble before a breakdown occurs. A volt-ohmmeter is issued to each mechanic who uses it regularly to check voltage at motor terminals and to test electrical circuits. The equipment inspector uses a tong ammeter at the cable nips to measure the current flowing to each unit under normal operating conditions. If a later reading shows an abnormal load, the equipment is checked to determine the cause. An audio-amplifier is used to listen to motor bearings to detect a defective unit before it fails and causes loss in production.

8. Good voltage at motor terminals is maintained at all times, every effort being made to keep 240 v at the motor brushes. If voltage drops to 220, a systematic check is made to find the reason and corrective measures are taken.

9. Employees are encouraged to increase their skills by attending courses in mine maintenance. Pecks Run co-operated closely with the School of Mines, West Virginia University, in establishing classes for mine personnel. The company provided a class room and the first course in mine maintenance, taught by L. H. Winger, Extension Div., School of Mines, was held on company property. Other coal companies co-operated in establishing the program and were invited to participate in the classes. To encourage employee participation, Pecks Run paid the \$5 deposit required for each man enrolling.



REGULAR REBUILDING is a key factor in preventing major breakdowns. All underground units are brought to shop once each year for inspection and repair.



TALLIES mounted in box in shop are used to keep accurate records.



TONG METER is used to detect overloads before equipment is damaged.



FINE-COAL CLOSED CIRCUIT can be achieved in a setup like this. System combines two-stage cyclones with filters for removal of solids. It is particularly useful where R-O-M coal is washed down to zero.

How to Stop Pollution

What methods are available for preventing stream pollution. How they can be used effectively in open and closed circuits.

By **A. G. GILBERT**
Contracting Engineer
Heyl & Patterson, Inc.
Pittsburgh, Pa.

"WHAT CAN WE DO about stream pollution?" is a question often heard around wet-type cleaning plants today. The answer is not difficult. By employing the proper equipment, you can prevent the contamination of streams and land, regardless of the type of cleaning facilities you use.

For example, at various plants, cyclones teamed with vibrators, filters and centrifuges; two-stage thickening; flocculation, froth flotation and settling

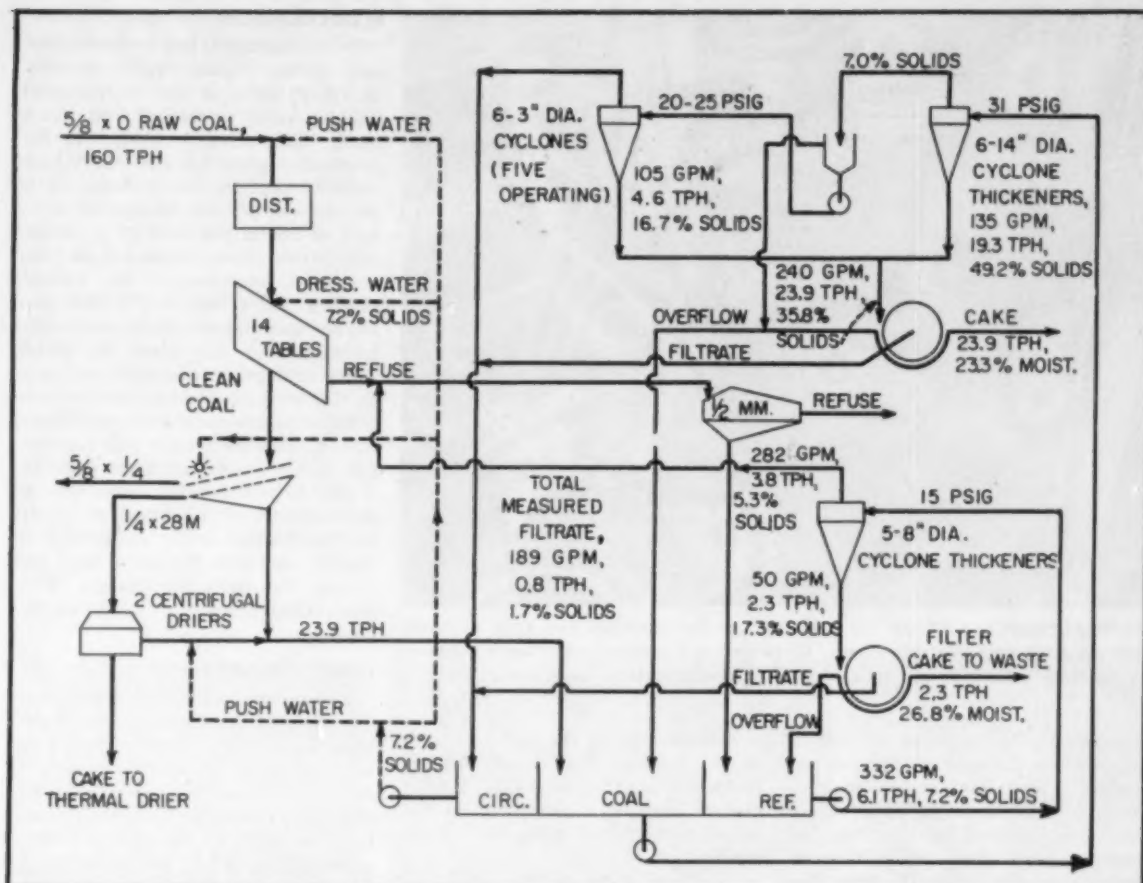
ponds are being used in various combinations to eliminate pollution. Frequently the equipment is paying for itself by recovering coal formerly wasted. A thorough analysis of your plant will determine what equipment will do the best job for you.

CLOSED CIRCUITS

Closed circulating-water systems are being increasingly installed, especially in the Eastern coal fields, to eliminate stream pollution. However, with this type of installation the make-up water into the plant circuit must not exceed the losses with coal and refuse. A closed-water circuit does not permit using fresh water for rinsing, push water and the like. Since clear

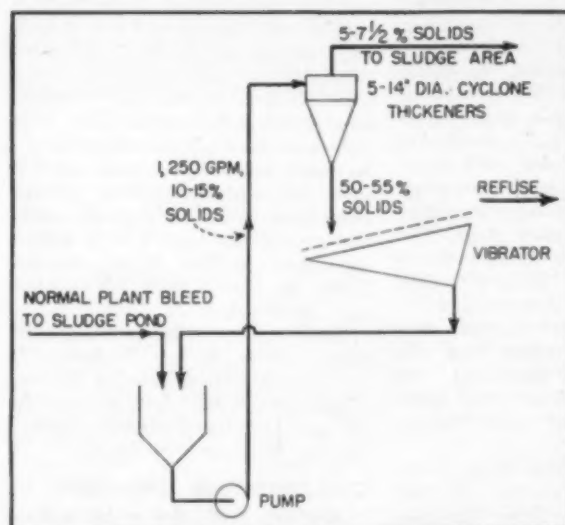
water is at a premium, it is normally used only on the stuffing boxes of various pumps and other essential purposes. The pump-gland requirements as a rule require a substantial portion of the total make-up water permitted, which means that the water being brought into the plant to maintain proper sump levels is a very small quantity. In a plant handling 300 to 500 tph, the make-up water required rarely exceeds 75 gpm. A plant of this capacity usually has four or five pumps requiring gland water ranging from 3 to 5 gpm each. Consequently, the total make-up water into the washing circuit rarely exceeds 50 gpm.

With cyclones and vibrating screens it has been possible to maintain closed

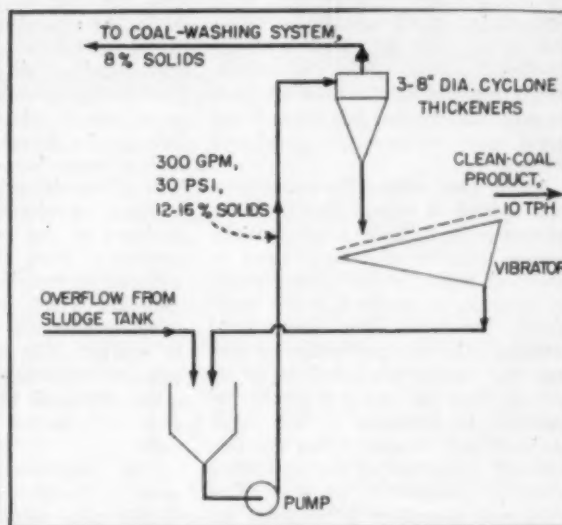


PREVENTING POLLUTION and recovering coal are twin benefits from using two-stage cyclones in a closed circuit.

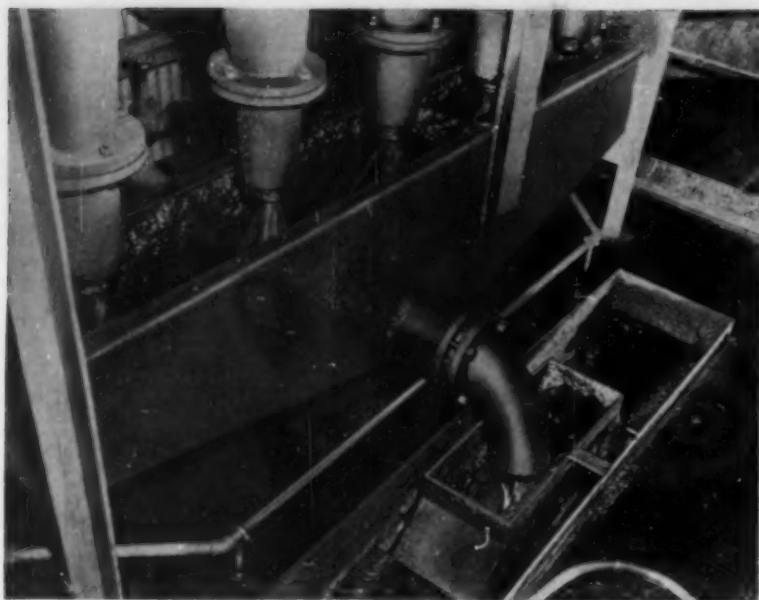
Three Ways to Prevent Stream Pollution



LIGHTENING THE LOAD on a sludge settling area can materially reduce the danger of pollution. Cyclone thickeners and vibrators are effective units for this job.



COARSE-COAL CLOSED CIRCUIT where coal is not washed to zero includes cyclones teamed with a vibrator to remove solids. Cyclone overflow is returned to washer.



TYPICAL INSTALLATION for pollution control includes five 14-in cyclones treating 1,250 gpm of waste slurry. Underflow is dewatered on vibrating screen to lighten load on sludge area and reduce operating costs materially.

circulating-water systems at certain mines where the entire tonnage is not washed to zero. For instance, one producer is using a single manifold of three 8-in cyclones handling the underflow from a slurry screen to completely close the circuit. However, this plant is washing only the plus 2-in material, and the only fines that have to be removed from the circulating water are error material and degradation plus some fines that are generated by the crushing of middlings. It is estimated that the equipment is removing approximately 3 tph of minus-28-mesh material from the circuit, permitting closed operation. It must be remembered that this plant is not using spray water on the clean-coal screens.

In the cases where the run-of-mine coal is washed to zero the problems become more difficult. A substantially greater quantity of material must be removed from the circulating water to provide a washing water sufficiently low in solids to permit good washing. Also the percentage of very fine coal (minus 325 mesh) to be removed from the water is greatly increased. In instances of this kind, cyclones and vacuum filters are best utilized. A portion of the circulating water is pumped to cyclones. The thickened underflow is normally dewatered on a continuous disk-type filter and the overflow from the cyclones plus the filtrate from the filter is returned to the circuit for

re-use. Because of the cyclone's ability to produce high-density underflows, considerable reduction in filter area is possible as compared to the use of conventional static settling devices.

TWO-STAGE THICKENING

We have found at a number of plants that a considerable quantity of low-ash coal is available in the 1-mm 100-mesh or 200-mesh fraction. Several operators have been successful in finding a market for this material. In these instances, we suggest two-stage cyclone thickening. A circuit of this type permits the recovery of many tons of valuable material which help pay for the cost of the installation and at some future date will represent a financial gain to the company.

These circuits normally use 14-in cyclones as the primary stage. The underflow from the 14-in cyclones will contain the plus 100- or 200-mesh material, which is dewatered on a vacuum filter and subsequently sent to market. The overflow from the primary cyclones, containing the minus 200-mesh high-ash slime material, is collected in small-diameter units.

The underflow from these thickeners is dewatered on isolated disks of this same vacuum filter. The cake from these disks is sent to refuse. The filtrate and the overflow from the secondary cyclones are returned to the plant circuit for recirculation.

FLOCCULATION

In recent years it has become necessary to use a considerable quantity of spray water at the underground working faces to control dust. As a result, the coal as delivered to the preparation plant has a relatively high moisture content. For instance, it is not unusual to have an average moisture of 5% in the feed to a normal preparation plant. Assuming that the combined moistures of the washed product and refuse is 5%, you can readily see that no fresh water may be added to this plant for gland water and other essential purposes. In this instance a flocculating circuit is added to the washing system. Therefore, to provide a clear gland water, etc., a bleed must be made possible. If bled to a stream, the limitations on the character of this bleed, as set up by the Eastern water authorities, is that the solids in the bleed must not exceed 300 parts per million. With flocculating apparatus this is readily possible.

OPEN CIRCUITS

Preparation practice and field custom make it desirable in many instances to waste large volumes of water containing minus 1/2-mm or minus 1-mm material. Such a practice may be warranted because the fines are high in ash and present a particularly difficult job of cleaning. Also, it may be desirable to use large volumes of fresh-water sprays to improve the appearance of the product.

Naturally the make-up water, or the water introduced into a circuit, exceeds the loss with the coal and refuse and a bleed must be provided. A number of the operators maintain large sludge ponds for impounding this waste slurry. Periodically the ponds either have to be dredged or otherwise maintained to receive the daily output of slurry. To combat this extravagant use of water, some method must be used to prevent spillage from these ponds into small creeks and streams that carry it on to adjoining farms or into larger streams. There are several ways this problem may be attacked.

Many circuits where bleeding takes place involve cyclone thickeners in conjunction with dewatering devices. These dewatering devices may be ordinary high-speed vibrating screens, vacuum filters or centrifuges.

CYCLONES AND VIBRATORS

Any step that lightens the load on sludge ponds and reduces the tonnage of material going out to sludge areas is a step in the right direction. A number of installations have been

made where the normal bleed from a plant is processed through cyclone thickeners. The underflow from the cyclone thickeners is dewatered on a high-speed vibrating screen which discharges into the refuse hopper. The underflow from the screen is recycled back to the cyclone feed. The overflow from the cyclones, which contains the extremely fine material, normally 200 mesh to 0, is conducted to the sludge areas.

This practice definitely lightens the load on the sludge pond and prolongs the life of the sludge area. It decreases, of course, the frequency with which the sludge ponds have to be dragged. Under these circumstances, however, the minus-200-mesh material stays in suspension much longer and requires greater settling time. When sludge ponds are approaching their maximum level, a number of circumstances could occur in which

the overflow from the sludge ponds could again contaminate the adjoining streams and surrounding farming areas. To prevent this, we have done a great deal of exploratory work with flocculation. It is readily possible to floc the minus-200-mesh material and secure rapid settling rates, producing a clear overflow from flocculating vessels or sludge ponds that would be acceptable for discharge to the stream.

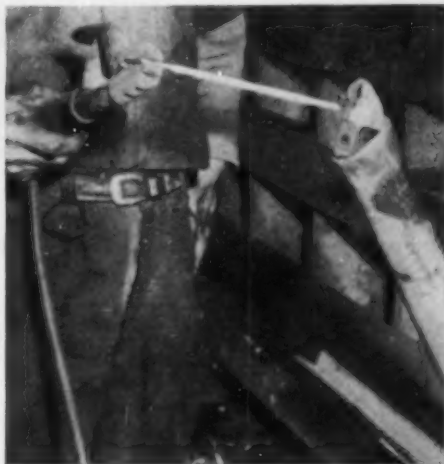
We have knowledge of and have worked on several plants with bleeds as high as 800, 1,000 and 1,200 gpm of slurry containing 10 to 15% and sometimes as high as 20% solids. This means solids are deposited in sludge ponds at a rate of 20 to 60 tph.

It would be readily possible to treat this bleed in cyclone thickeners, and recover a substantial portion of the material now going out to sludge areas, which subsequently need draining and cleaning. This method will

serve as a real advantage from a material-handling standpoint and should reduce operating costs materially.

The cost of equipment where only cyclone thickeners and vibrating screens are used to reduce the load on sludge ponds is very small, while the dollar return is very high. The installations normally pay for themselves in a short period of time. An installation of this sort, however, will not in any way combat or eliminate stream and farmland pollution unless the secondary steps are taken to further clarify the overflow from the primary cyclones.

The chief advantage of a circuit of this sort is to lighten the load on sludge ponds and reduce the quantity of pollution or contamination of streams or farmlands that could occur at flood time or under unusual circumstances, such as a break in the dikes or something of that nature.



JACK IMPROVEMENT A SIMPLE MATTER—End of pipe is shaped as a socket for the bit holder (left); bit holder is welded to the end of pipe (center); and throwaway bits inserted (right) to provide an "ever-sharp" jack point.

"Ever-Sharp" Jacks Increase Safety and Cut Operating Cost

AN IMPROVEMENT in shortwall cutting-machine jacks developed at the Paragon mine of the Amherst Coal Co., Yolyn, Logan County, W. Va., provides safer operation, reduces labor for the cutting-machine crews and cuts maintenance cost of jacks. Instead of the typical forged point on top of the jacks, the point used is a throwaway cutter bit.

Most of the roof in the mine is a hard slate, and the rest sandstone. With the bit on the upper end, the jack digs up into the roof and saves the crew the labor of picking a hole.

Since the bits are easily changed the jack point is always kept sharp. In addition, not having to send the jacks out for resharpening saves transportation and forging labor, as well as reducing the number of jacks required.

In making this type of jack, the first step is to heat the end of a piece of 2-in double-strength pipe and shape the end roughly to form a socket for a Cincinnati Duplex bit holder.

The holder then is arc-welded to the end of the pipe.

The "ever-sharp" jacks have been used consistently in the mine for several years. E. R. Loudermilk, blacksmith at the mine shop, suggested and built the first of them. After a brief trial of the original, he was assigned the job of making enough to equip the mine and now makes up renewals as needed.

More Mine-Tested "Operating Ideas" Appear on pp 102 and 104



UNDERGROUND, W. B. Pendleton, transitman, talks over trolley-powered loudspeaking telephone near head of section belt. Batteries take over if DC mine power falls.



IN LAMP HOUSE, John E. Maner, general mine foreman, uses "press-to-talk" handset of loudspeaking phone which is tied into mine's trolley-powered phone system.

Modern Mine Communication



AT CAR-LOADING POINT, one of nine newly installed loudspeaking telephones (arrow) gives boom man direct communication with shuttle-car drivers unloading at belt head, as well as with moving locomotives and outside stations.



INSIDES of loudspeaking unit easily drop down out of dripproof box. One emergency dry cell appears at right.

Loudspeaking mine telephones

with auxiliary battery power are tied in with trolley system to provide complete communication coverage at minimum installation cost.

By PAUL MORTON
Cannelton Coal & Coke Co.
Cannelton, W. Va.

IN OPENING its 100-A mine, the Cannelton Coal & Coke Co., of Cannelton, W. Va., is modernizing everything from mining, haulage and preparation to offices and shops for efficient operation. Management realized that bringing each department up to the best-known modern practices is like getting good players on a team, but it is teamwork rather than players that wins a game. Careful consideration and planning indicated that communication was the key to a co-operative and efficient operation.

When the new cleaning plant was put in operation some months ago (*Coal Age*, January, 1953, p. 108) a modern high-powered amplifier system was installed between key points to provide communication. This worked so well and added so much to operation that it was an incentive to study further the problem of communication for the mine.

MINE OPERATION IMPROVED

Trolleyphone communication was first installed to talk between the lamp house, locomotives and shop. Trolleyphones are compact frequency-modulated carrier-current transmitter-receiver units that talk over the trolley wire and rail circuit, thus providing a communication circuit between a fixed location and locomotives, and also between locomotives. While this was a vast improvement in operation, further study indicated that a more complete system that would tie in the belt and tippie operations would be still more efficient. Accordingly, communication manufacturers were called in to see what could be done.

One obvious way to get the desired results was to put a carrier current transmitter and receiver at each point of communication. However, so many fixed points of communication were desired that the quantity of equipment required was large and the cost high. Also, to meet mining law regulations, it would have been necessary to keep

up an old-fashioned mine telephone system to provide for talking when the mine power failed.

NEED AND ANSWER

The need and the problem were clear. Since necessity is often the mother of invention, the engineers of Femco, Inc., were called in for consultation, and an equally clear answer to the problem was developed. It is the loudspeaking telephone with auxiliary-cell battery for "power-off" communication.

The loudspeaking telephone is aptly described by its name. It is wired to a telephone pair exactly the same as any telephone. The trolley circuit customarily connected to a lamp bulb inside a box to keep the telephone dry is now run into the new telephone to serve two vacuum tubes used for power amplifiers.

Each telephone is equipped with a standard telephone handset with a "press-to-talk" button in the center. To communicate, you simply pick up the handset, press the button and talk. Voice output from the transmitter is amplified and fed to the telephone pair at a power level about 1,000 times greater than the usual telephone. All other loudspeaking telephones on the line pick up the voice signal from the line, amplify it, and send it out over a bell-type loudspeaker at any desired level. No ringing is necessary. You simply call the party you want.

When mine power fails, a "power-off" relay in the telephone releases to provide a talking circuit over the handset powered by three No. 6 dry cells in the unit. This feature means that the unit also serves as a standard telephone, and an additional pair of wires with regular telephones is not required.

Coupling to Trolleyphones so that all fixed stations can talk to the locomotives is accomplished by a very simple coupling unit. The loudspeaker output from one fixed Trolleyphone is fed into the telephone line and thereby talks to all loudspeakers on the telephones. When talking from any telephone, the output from the telephone

line feeds into the microphone circuit of the Trolleyphone and talks to all of the locomotives. Each fixed station therefore operates as though it were a Trolleyphone, but in addition provides telephone service automatically when power fails.

DESIGN AND ADVANTAGES

The loudspeaking telephone housing is 16 in high, 10 in wide and 7 in deep. The two amplifier tubes keep it dry, and the handset rests on top facing down so that it sheds water and is kept dry by heat from the box. The complete chassis slides into the box from the bottom, so that no water can get into the unit. Because amplifiers are used, the line does not become overloaded as more stations are added. Background hum and noise in the speakers is scarcely audible because of the high power level used to send voice over the line—this is in spite of the fact that we use rectifiers for mine power and have always had a very noisy telephone line.

The system has many outstanding advantages. By placing loudspeaking telephones at the boom and tail piece of each belt, direct communication can be had from the head of underground belt to the locomotives and tippie for distribution of empties and picking up loads, and from the tail of the belt to the shop or other maintenance men throughout the mine for expediting repairs. Mine personnel can be quickly located and consulted to keep things going smoothly. The superintendent and foremen are in constant touch with all phases of operation and have a ready means available to take action.

At present, nine of the Femco loudspeaking auxiliary - battery - powered telephones have been installed, of which six are underground and three outside. Seven locomotives are equipped with standard Femco Trolleyphones which are tied in with the loudspeaking sets but have no auxiliary batteries for communication when the trolley power is off. As a result of 10 mo favorable experience with the new phones in the 100-A mine, the 100 mine will be likewise equipped.



Medium-capacity stripping machines feeding bulldozers for final spoiling provide economical means for stripping restricted area. Production cuts worked perpendicular to box cut satisfy production and spoil-area requirements at operations of William Piccolomini.

DRAGLINE, shovel and three bulldozers are earthmoving team for stripping overburden from 8½-ft Pittsburgh seam. Loading shovel in foreground removes exposed coal to provide additional spoil room.

Stripping in Cramped Quarters

ONE MAN'S AMBITION can benefit a number of people. Here's how.

A few years ago William Piccolomini, Connelsville, Pa., fulfilled his fondest dream when he purchased a bulldozer and entered business for himself. He scouted jobs for his machine and, operating it himself, he soon had a reputation for completing jobs in a workmanlike manner in spite of bad weather, long hours at the controls or other adverse factors. Bigger and better jobs naturally followed. More machines became necessary and these required operators.

The outcome of this effort is that Mr. Piccolomini now has a contract to strip an 800 by 1,800-ft area of the Pittsburgh seam at York Run, Fayette County, Pa., for the U. S. Steel Co. Four excavating units, four bulldozers, an overburden drill and other auxiliaries require the services of 12 men. Coal haulage is sublet by Mr. Piccolomini and 14 other men find employment here, the majority of them in their own trucks.

STRIPPING AND LOADING UNITS

The stripping and loading equipment includes two Koehring 1005 units and two Koehring 605's. One of

the 1005's is fitted with a dragline front (80-ft boom and 3½-yd Hendrix bucket) and the other is equipped with a high-lift shovel front (50-ft boom, 36-ft dipper stick and 2½-yd Amsco rock bucket). The two 605's are shovel-front units, one with a 2½-yd Esco coal-loading bucket and the other with a 1½-yd Amsco bucket. The latter is used for stripping or loading, as the demands of the job dictate.

The job consists of the removal of support pillars which had been left under the tipples and coke ovens and along the slope at Kyle mine. Recent abandonment of these surface facilities permits recovery of the extensive pillars in the 8½-ft seam.

Overburden normally is about 40 ft thick, although in one portion of the property the cover increases in thickness to 70 ft or over.

The plan of operations includes the teaming of bulldozers with the excavating units. The medium-capacity units are flexible enough to maneuver sufficiently over the rough ground and their limited reach is extended by the bulldozers, which spread the material dumped by the shovels and dragline. The dragline is served in

this manner by a single bulldozer but the shovel keeps two dozers busy. One big advantage of the system is that the spoil is backfilled as an integral element of the over-all stripping operation. Three of the bulldozers are Caterpillar D-8's and the fourth is a D-8 Pusher, a beefed-up version of the D-8. The original D-8 purchased by Mr. Piccolomini still is in everyday service.

The highwall drill is a self-propelled, horizontal Hardscog unit. In drilling the thinner overburden the drill operates from the top of the coal in the previous cut. When higher drilling is necessary the drill is mounted in the bed of a truck to raise it to the drilling horizon.

PREPARING OVERBURDEN

In cover thinner than 45 ft the blastholes are drilled horizontally through the roof coal on 15-ft centers to a depth of 50 ft. Such holes are charged with 100 lb of explosives in each and stemmed the remainder of the way. In cover ranging from 45 to 55 ft in thickness, the holes are drilled 6 ft higher up and charged with 200 lb of explosives in each.

In cover more than 70 ft thick the

holes are drilled in two rows, one above the other. The top row of holes is drilled 20 ft down from the top of the highwall to break up a 15-ft thick stratum of hard rock which is present at the top. The drilling is done from an 80-ft-wide bench which is constructed on top of the main overburden bench throughout this thicker cover. The bottom row is drilled from the truck at a distance of 8 ft from the top of the seam or 6 ft from the top of the roof coal. Broken material from the top bench is pushed into the spoil area after the coal has been loaded out. This material helps to confine the coal while the bottom bench of overburden is shot.

Mr. Piccolomini believes in making an investment in explosives sufficient to break up the material to the point where the stripping units will have no trouble at all in handling the largest possible pieces. Secondary shooting is practically eliminated and the additional cost of powder is more than recovered in increased productive working time for the machines and in markedly reduced maintenance.

The pit was opened by a box cut from 55 to 70 ft wide through the center of the area, generally following the long axis of the site. Thus the highwall for future operation was established. The coal was left in this cut and production comes from cuts which are made perpendicular to the box cut.

HAUL ROAD ON COAL

The object in leaving the coal in this box cut was to insure the best possible haulage conditions in all kinds of weather, since the material under the seam is fireclay, which is unreliable as far as truck haulage is concerned.

At the time of the visit, the operations had been shifted to the west corner of the property, the point to which the seam dips. The coal was to be removed from this area before the wet season began, thus providing an adequate drainage sump into which pit water would flow. Pumping would be eliminated except for that required in localized spots, and the drainage problem would be solved for the winter.

The normal practice is to maintain two active coal-loading sites. As shown in the map, a series of cuts is being made along the south limit of the job. This work is done by the 1½-yd shovel at present, although one of the larger units will handle overburden as soon as the drainage corner is completed.

The use of the double loading point prevents traffic snarls in the pit among



SPOIL FROM 3½-YD DRAGLINE is pushed outward by a single bulldozer, forming level, backfilled spoil areas during course of stripping operations.



SLOT-DOZING TEAM of bulldozers serve 2½-yd stripping shovel which piles spoil between their paths. Overburden ranges up to over 70 ft thick.



UNCOVERED COAL at secondary site is loaded into truck by 1½-yd shovel.



WILLIAM PICCOLOMINI started out with one bulldozer.



FLEET OF 14 TRUCKS hauls coal from mine to river-loading facilities 10 mi away. Use of double loading sites prevents traffic snarls.



HAULAGE ROADS through spoil areas are carefully maintained for fast, all-weather operation of truck fleet.



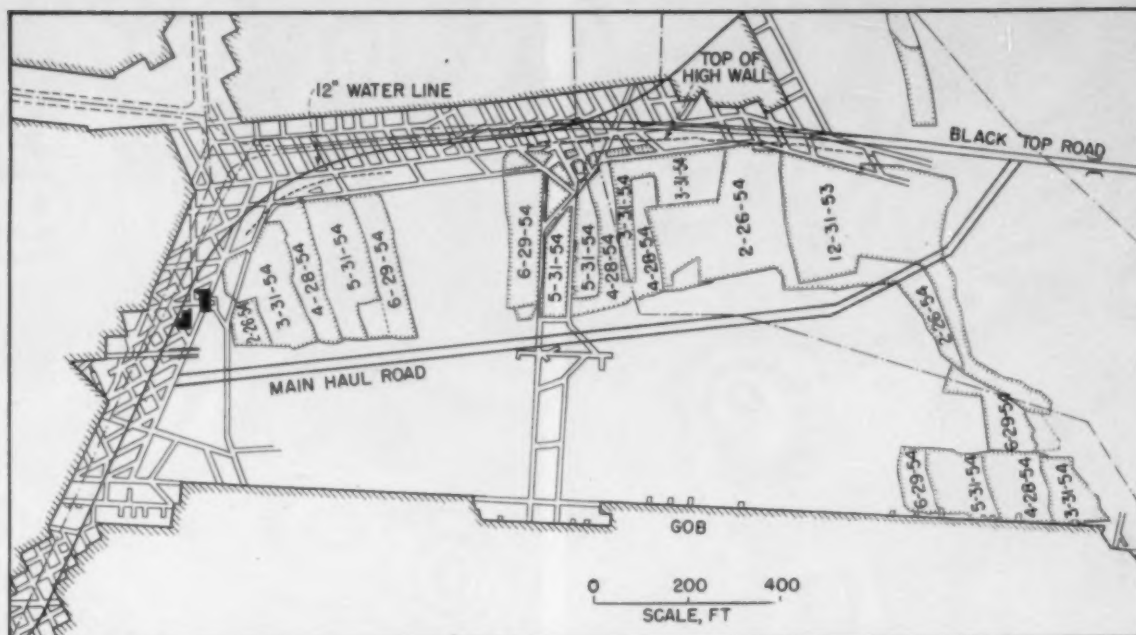
HIGHWALL DRILL sinks 50-ft-long 5¼-in horizontal holes on 15-ft centers in roof coal above drawslate.



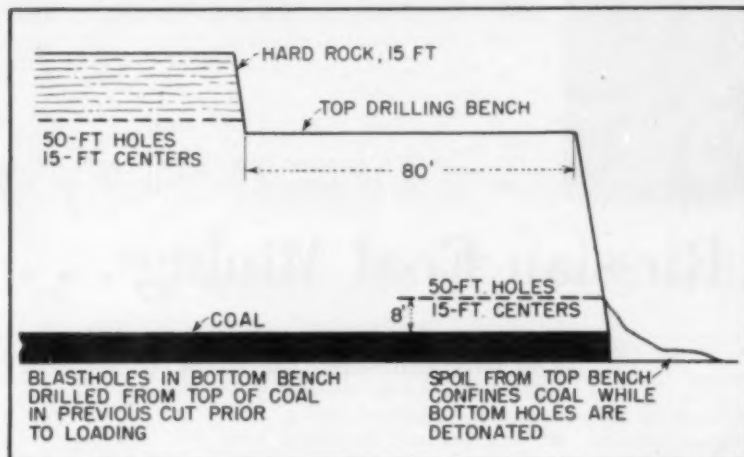
GASOLINE-POWERED 4-IN PUMPS drain localized water accumulations, have sufficient hose to discharge over spoil banks into nearby creek.



PORTABLE UNIT drills blastholes for breaking up coal.



PERPENDICULAR CUTS, worked from the initial box cut, provide coal production as needed and spoil areas.



SHOOTING IN OVERBURDEN more than 70 ft thick is done in two benches, the top bench being worked 80 ft in advance of the bottom one.

the 14 haulage trucks and the other units. The haulage fleet includes four 10-ton Fords, eight 16-ton White tandems and two 10-ton Whites. The coal is hauled 10 mi from the pit to barge-loading facilities at U. S. Steel's Ronco mine on the Monongahela River, each truck making seven or eight round trips per day.

Two loading sites also insure available coal for loading even though some unforeseen difficulties may arise at one of the sites. Spoil room in the confines of the pit is at a premium. Therefore, it is necessary to load coal out of the production cuts as

rapidly as possible to make room for spoil from the following cuts. With stripping and loading following so closely, it pays to have two loading sites.

Furthermore, with loading geared to what the parent company desires in the way of daily production and with stripping geared so closely to loading, the operations are on a single-shift basis, since otherwise the stripping units would outrace the loading units and create spoiling problems.

PIT SERVICES STANDARDIZED

In maintenance matters, Mr. Picco-

lomini strongly believes in standardization. That is his reason for selecting three more Koehring units after being completely satisfied with the first 605 he bought. Then he went a step further by specifying Caterpillar power units for the excavators—Model 364 diesel engines in the 1005's and D13000 engines in the 605's. Engine repairs on either bulldozers or excavators can be made at one place, the Caterpillar agency.

Smaller units such as the highwall drill, coal drill and pumps are powered by Wisconsin gasoline-powered, air-cooled engines. The pumps are 4-in Gorman-Rupp units, equipped with enough firehose to permit the disposal of pit water over the spoil banks.

Service for the excavators is provided by the Koehring company service engineers, although a minimum of such service has been required so far. For example, the 1005 shovel features cable-powered crowd action with twin crowd cables. One of these had to be replaced 4 mo ago but the other has been in service since February, 1952. Mr. Piccolomini maintains that some of his added investment in explosives has been recovered right here and the remainder of that investment and more in numerous other such ways.

Minor repairs are made on the job, but the life of the job does not warrant setting up major shop facilities in the area nor the establishment of an extensive parts depot.



MODERN SOVIET MINES are typified by steel-reinforced

ROCK LOADER, American style, is one of "some 200" new coal units Russia claims to have developed since 1945.

Report on Russian Coal Mining . . .

By SEABROOK HULL

McGraw-Hill WORLD NEWS, London

RUSSIA, in her efforts to convince all the world, except the U. S., of the peaceful intentions and economic benefits to all of Communism, has lately been giving the West controlled looks at the more modern examples of Soviet industry. Needless to say, Western reporters have no way of assessing the accuracy of Russian claims, since the kind of searching check that is commonplace in the U. S. is, in Russia, called—quite simply—spying.

What follows is based on material appearing in, among others, the London-published newspaper, *Soviet Weekly*. It is, so to speak, a quick look at Russian coal mining "through rose-colored glasses."

The picture is one of great increases in production, attainment of an impressive degree of mechanization and electrification and, as always, happy miners. While some of the claims may be intentionally exaggerated for propaganda purposes, it is known that the Reds have been concentrating on their coal mines as a basic prerequisite to all other industrial expansion. It is likely that a fair percentage of what they claim to have done, they have in fact done. Here then are their claims.

Coal production, at 166 million tons in 1940, hit 320 million tons in 1953. Main increases have been made in

the Urals, Siberia and Kazakhstan. Russia claims 20% of the world's total recorded coal reserves. Greater output results both from the opening of new pits and the introduction of mechanized mining. Since 1945, Russia claims, her designers have developed "some 200" new pieces of mining equipment. They include combines that undercut, break down and load the coal automatically onto conveyors. These are adjustable to seams of differing pitches and thickness. Maybe 30% of current Russian coal production is machine-loaded at the face. One such combine, the KKP-1, will mine a face of 100 to 120 yd per shift and, Russia says, is operated by one man with two timbermen behind.

Mechanization in Red mines includes coal-cutting and breaking, underground transport and surface loading onto railroad cars. Electric locomotives used in the mines are up five times from prewar. No actual figures are given.

The Russians are using eight types of coal and five types of tunnelling combines. One of these, called the Donbas coal combine, is used in gently sloping and inclined seams of average thickness and has a cutting output of up to 60 tons an hour. The KKP-1 is used in steeply sloping seams; the Gornyak, UKT and UKMG in thin seams; and the VOM-14 and K-14 in thick horizontal seams. About 2,000 loading machines are now operating in Soviet mines. So far, 2,040 underground conveyors, 2,400 combines and



drift. Electric locomotives "are up five times over prewar."



ANOTHER DEVELOPMENT is this more powerful scraper conveyor that mines a much longer face, Russia says.

DONBAS COAL COMBINE has a cutting output of up to 60 tons per hour and is the most used of the eight types.



... "Through Rose-Colored Glasses"

coal cutters, and over 2,000 winches and pushers have been changed to remote control. Some 1,850 automatic pumps have been installed.

A concentrated effort is being made to introduce hydraulic mining on wide scale by the end of 1955.

Both metal and ferro-concrete propping is used as well as wood. Metal props are used in 900 pits, while 1,500 mi of drifts have either metal or ferro-concrete supports. The standard for wood is that there must be installed 65 to 80 cu yd of propping timber for each 1,000 tons of coal excavated.

All pits are electrified. Every drilling device is equipped with pneumatic dust absorbers or sprinklers. As a precaution against dust explosions shale dust neutralization is used. Maximum allowable methane concentration is one part in a hundred of air, after which workers are evacuated and special corrective measures taken. As a preventative step, drainage wells are first drilled in those faces that appear likely to give off methane. While this drainage takes place, work is shifted to the surrounding "protective" faces.

With increased mechanization, the need has gone up sharply for skilled machine operators. To fill this need, Russia now has 350 schools for miners, with a constant training rate of 50,000 annually. In addition, there are advanced training courses organized at the mines.

Virtually all Soviet miners are members of the Mine Workers' International Union, which has 4½ million members in 26 countries. The country total undoubtedly includes the "Republics" within the U.S.S.R., as well as the satellite countries outside Russia proper.

Housing for miners built since the war includes 250,000 new flats and 73,000 private houses built by the miners.

One interesting factor evident in the more-recent industrial reviews put out by Russia for non-Communist consumption is the creeping in of an extremely non-dogmatic note that smacks of capitalism. In painting the picture of easier living for the miner through mechanization, safety and health measures, it is always noted that even though one machine may do the work of 20 men, nobody loses his job, and everybody makes more and more money. Top-paid miners, it's claimed, can make as much as 61,500 rubles a year, plus a 6,840-ruble annual bonus. Applying the "official" exchange rate of 4 rubles to \$1—which is entirely unrealistic—makes those earnings \$15,400 and \$1,710, respectively. To figure actual purchasing power, you should probably knock off at least a "0"—divide by ten. It is known, however, that Soviet miners are a lot better off than many other classes of workers. In addition, if a miner has 20 yr in the industry he is eligible on reaching the age of 50 for a pension, whether he works or not, equal to 50% of his basic wage (unstated).

Fire-Retardant Coatings

What they are . . .

What they do . . .

How to select them . . .

How to use them . . .

"Water-emulsion, synthetic-resin-phosphate coatings are recommended for most underground and surface applications. Of the products tested, these are the most effective fire retardants. They do not appear to be affected by mine conditions, and the protection they afford may be checked by observing the thickness of the coatings."

By P. F. YOPES
Mining Engineer
U. S. Bureau of Mines
Seattle, Wash.

MANY PRECAUTIONS AND PREVENTIVE MEANS are employed to reduce fire hazards when wood or other combustible materials are used for ground support or construction in mines or surface buildings. One such method that has not been used in mines to the extent warranted is spraying or brushing timbers with a fire-retardant coating or solution.

More than 20 companies make such compounds, but lack of knowledge of their effectiveness, limitations and characteristics has restricted their use. In addition, acceptance of the good products available has been further hindered by extravagant claims and promotion of products of doubtful value.

It should be emphasized that no treatment can make wood fireproof. The use of non-combustible materials in mining applications is preferable, wherever possible.

A fire-retardant coating may prevent wood from catching fire from a relatively small outside source of igni-

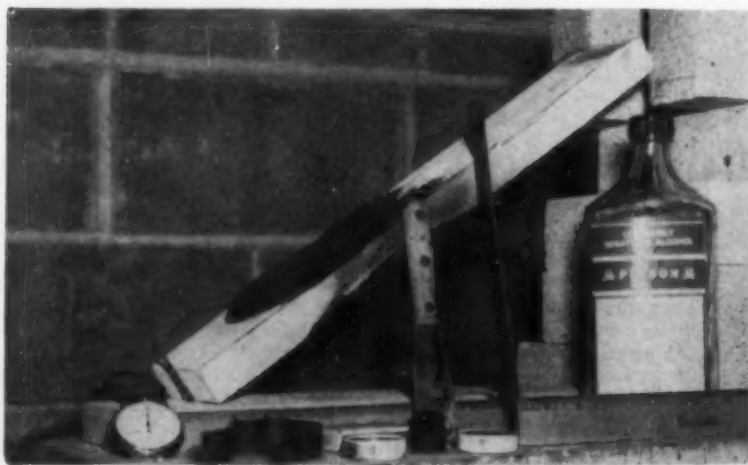
tion and will slow down its burning rate if it should catch fire, affording time to fight the fire by conventional means. One type has been recommended for use on steel and concrete members to serve as a heat retardant. This coating swells into a tough, cellular, insulating mat at a relatively low temperature, protecting members from the heat of a fire and so reducing spalling of concrete and heat-softening of steel.

HOW FIRE-RETARDANTS WORK

Most solid material does not burn until it has been decomposed by heat and flammable gases have been generated. Remaining charcoal may glow in the presence of oxygen and spread the fire by heat radiation, but flame and fire are spread principally by burning gases.

Fire-retardant coatings and solutions act through a number of mechanisms to reduce formation of flammable gases and to hinder the meeting of these gases with the oxygen in the air. There are four general types of fire-retardant mechanisms, as follows:

1. **Development of a heat, flame and gas barrier**—The most effective type of barrier is developed by coatings that swell into a spongy insulating mat many times the original thickness when exposed to heat. Some act in a somewhat similar manner, but less effectively, by developing blisters when exposed to fire. Other retardants contain borax or other easily-fusible chemicals, which melt to form a glaze



SIMPLE TEST EQUIPMENT permits rapid evaluation of fire-retardant effectiveness of various coatings. This specimen shows a cellular insulating mat on top surface, a result of heating the coating.

when exposed to heat, confining wood gases and protecting the underlying material. Chemical-solution retardants promote formation of a protecting and insulating skin of soft char. The barrier provided by many retardants (by all of them to a certain extent) is simply the crust of incombustible paint pigments and coarse particles that remains after the volatiles in the compound have been baked or burned out. A protective skin produced in this manner is effective if the fire is not intense but may crack or spall off under severe fire conditions.

2. Generation of inert gases—The inert gases, generated when the fire-retardants decompose upon exposure to heat, dilute flammable wood gases and smother combustion.

3. Alteration of the combustion process—Chemicals that alter the combustion process of retardant-treated wood cause char to be formed at low temperature and retard formation of flammable gases as the material decomposes in the heat.

4. Heat absorption—Decomposition of fire-retardant chemicals results in absorption of heat from the fire, but this is a minor effect.

TYPES OF FIRE RETARDANTS

Fire retardants may be grouped in five general classifications, as follows:

1. Chemical solutions, generally in water, absorbed by wood.

2. Chemicals mixed with water that form a coating like whitewash, which may also contain soluble chemicals absorbed by the wood. The best products of this type contain synthetic resin and ammonium phosphate compounds.

3. Conventional oil-base paints containing fire-retardant chemicals as part of the pigmenting material.

4. Oil-base paints containing fire-retardant chemicals as part of the pigmenting material and having a special vehicle that also contributes to the fire-retarding property.

5. Mastic compounds containing relatively large particles of incombustible materials, such as mica, vermiculite and asbestos, and, in some cases, fire-retardant chemicals.

The fire-retardant chemicals in the coatings are principally borates and antimony oxide in oil-base paints and monammonium phosphates in water-base paints.

Fire retardants vary greatly in effectiveness and in such other characteristics as durability and appearance, even though they may be of the same general type. As the effectiveness of a product cannot be determined by

appearance or by everyday use, selection can be based only upon knowledge of actual fire experience or data obtained from laboratory tests.

HOW TESTS ARE CONDUCTED

The Accident Prevention and Health Div. of the Bureau of Mines began an investigation of fire-retardant coatings and compounds in 1949, in recognition of their importance as a possible means of mine-fire protection.

Samples of such coatings were obtained from manufacturers, and tests were conducted on 16 different products or combinations of products and Gunitite, applied according to manufacturers' instructions. Test panels were 2x4x18-in pieces of Douglas fir with rough-sawed surfaces similar to those of actual mine timbers.

Each paint or compound was brushed on one side and both edges of each of four test panels. Measurements to determine coverage were not made, but all were applied in a similar manner after being thinned to brushing consistency. The panels were painted at Knob Hill mine, Republic, Wash., and seasoned overnight in a heated changehouse between coats. Those with numerous knots or excessively heavy pitch were rejected.

A fire test, as explained later, was applied to one of each set of four panels 3 wk after treatment. The remaining panels then were placed at a 6th-level station of the Knob Hill mine. One panel treated with each product was removed after 6-, 12-, and 18- or 24-mo exposure to determine whether or not the fire-retarding property of the various coatings had changed. The panels were in exhaust air, at 90% relative humidity and 58 deg F, dry bulb.

The testing method is an inclined-panel test, using denatured alcohol as a fuel. The panel is placed at an angle of 30 deg from horizontal, as shown in the illustration, with the side to be tested facing down. The test flame is provided by 10 cc of denatured alcohol (burning time, 6 min) ignited in a No. 1 Coors combustion dish. Standard support conditions for the panels and precise placement of the flame were observed to provide comparable results. Both the treated and untreated sides of each panel were flame tested.

Observations were made as follows: The amount of smoke and presence or absence of odors were evaluated, by sight and smell.

Duration of afterflaming (number of seconds the wood flamed after the alcohol had burned out) was measured.

Area and depth of charring were

determined, using a scraper and saw blade for removing char.

Over-all length of char of appreciable depth was measured, and an estimate, expressed as per-cent effectiveness, was made of the amount combustion had been retarded by treatment. This is an empirical quantity, applicable only to this test, for permitting comparisons to be made. It is not an absolute measure of fire-retardancy under all conditions of severity.

WHAT THE TESTS SHOW

The comparative performance of the 16 coatings is summarized as follows:

1. Two water-emulsion, synthetic-resin-phosphate coatings were much more effective than the others and did not lose their effectiveness after exposure in the mine.

2. One Type 4 oil-base paint showed almost as much fire-retarding strength as the two synthetic-resin-phosphate coatings when freshly applied and exhibited the same characteristic of swelling into a protective mat upon exposure to heat. However, its effectiveness diminished to 50% after 12-mo exposure in the mine.

3. The mastic-base coatings were about 50% effective and retained their fire-retarding strength under mine exposure. However, they appeared to give off flammable volatiles when exposed to the test flame and produced heavy smoke. Their fire-retarding property consisted largely of the protection offered by the residual incombustible crust left after the volatiles had burned out.

4. Nine coatings of the oil-base and water-solution types showed from 25 to 40% effectiveness. Some retained or increased their fire-retardant ability after aging in the mine, whereas others lost some of their effectiveness. The water-solution types required an overcoating to prevent loss of effectiveness.

5. Two water-emulsion coatings proved of no practical value for mine use. One, an asphalt-water emulsion, had very little fire-retarding strength, and the other, containing sodium silicate, had lost most of its effectiveness after a year of mine exposure.

HOW TO SELECT

FIRE-RETARDING COATINGS

A number of characteristics, in addition to fire-retarding ability, enter into the choice of a paint or compound for a particular job. Some of the principal factors to be considered are:

1. **Durability**—A coating must be

able to stand up in mine service. Mastic coatings are most durable, and are resistant to both chemical and mechanical attack. Fire-retardant chemicals may leach out of a water-base and some of the oil-base coatings if surfaces treated with them are washed or exposed to dissolving action in some other way. The most effective fire-retardants among oil-base paints generally are least resistant to leaching. Water emulsions do not adhere well to smooth surfaces and are removed by vigorous washing.

2. Finish—Appearance may be an important factor in selecting a fire-retardant for surface buildings where variously colored, glossy, washable paints often are required. Although of less importance underground, a light-colored reflective finish is a desirable feature. Water-solution compounds darken timbers slightly, whereas most coatings give a light-colored finish. Asphalt-base mastic is black, but it can be made reflective and more attractive by adding aluminum pigment. This increases the cost but probably also increases the fire-retardant ability of such compounds.

3. Adverse effects on strength or deterioration of material or fittings—It is doubted that spray- or brush-applied coatings directly affect the strength of timbers, but heavy mastic coatings may accelerate and hide decay in the same manner that Gunite does. Some compounds, particularly the water-solution chemicals, corrode metal fittings. If this is an undesirable feature, a non-corrosive compound or one containing anticorrosion chemicals should be specified when buying.

4. Toxicity—None of the retardants is known to generate dangerous amounts of toxic gases during a fire or to be toxic to the skin. One synthetic-resin-phosphate paint has been reported to give off irritating fumes when curing; in one mine hoist-room application the fumes persisted for 6 wk after painting. When a coating with this characteristic is used, painting should be done offshift or on week-ends.

5. Application hazards—Flammable and sometimes toxic thinners are used in oil- and mastic-base paints. Precautions against fire, explosion and gas-poisoning must be taken when these are used. Water-base coatings may contain chemicals toxic enough to require the use of respiratory protection while spraying.

6. Ease of application—All can be applied by spraying or brushing and there is not much choice among prod-

ucts in the matter of application. Water-solution coatings probably are easiest to apply and require the least amount of surface cleaning beforehand. Two coats are recommended for all products, and a longer drying-time between coats must be allowed for water-solution products than for oil-base, especially under humid mine conditions.

7. Inspection, testing, maintenance—The mastic-base paints, some of the oil-base paints and the synthetic-resin-phosphate coatings do not seem to lose fire-retarding capacity. This can be checked by visual examination of the coating's thickness and cover. Other coatings cannot be checked by visual examination and must be maintained by repeat applications at regular intervals, or provision may be made for actual tests of their effectiveness from time to time. This can be done by preparing a number of test panels when the timbers are painted and removing and testing one of these occasionally.

8. Cost—The cost of treatment with these coatings must be compared with the cost of other available means of fire protection and be considered with respect to the degree of fire hazard. In mine uses the entire cost should be charged directly to fire protection, whereas in surface buildings that would normally be painted with conventional paints, only the increase in cost resulting from the use of these special-purpose coatings should be charged to fire protection. Costs will range from 2c per sq ft for some water-solution compounds to 5 to 20c per sq ft for the other products, depending largely on thickness of coating.

WHERE TO USE THE COATINGS

Timbered underground hoist rooms, shaft landings, offices, explosives magazines, shops and rooms enclosing mechanical and electrical equipment are the most obvious places warranting the use of fire-retardant coatings since they present the greatest fire hazards. Circumstances may justify their use in parts of shafts, haulage-ways and airways, but costs and difficulties of application and maintenance may prohibit their general use.

The merits of different types in various applications are as follows:

1. Water-emulsion, synthetic-resin-phosphate coatings are recommended for most underground and surface applications. Of the 16 products tested, these are the most effective fire-retardants. They do not appear to be affected by mine conditions and

the fire protection they afford can be checked by observing the thickness of the coatings.

These coatings are not washable and do not provide a durable finish. However, tests and actual use have shown that they are serviceable enough for ordinary mine use. They should not be used on floors, furniture or other surfaces exposed to heavy wear. A trial area in a mine showed no undue wear after 2 yr, except where particles had been chipped off as a result of setting drill steel and other equipment against the coating. Irritating fumes produced by one product of this type is a disadvantage in poorly-ventilated places. Products that do not produce such fumes can be obtained.

2. Water-solution compounds are used because of low cost and ease of application. It is reported that a water solution of a fire-extinguisher agent, consisting principally of potassium carbonate, is used at one mine where the timbers are treated every 6 mo. The most serious disadvantage of this type of retardant is the difficulty of determining effectiveness, which depends upon the quantity of chemical deposited in the wood fibers and upon its resistance to chemical reaction with constituents in mine air or timber. Application should be carefully supervised and fire-retarding capacity carefully checked, or repeat applications should be made at regular intervals.

Some water-solution compounds may be painted over with other coatings if the hazard warrants the increased cost. However, wood treated with the fire-extinguisher agent cannot be overcoated since paint will not adhere to the treated surface.

3. Oil-base coatings generally are not suitable for use on mine timbers because of possible loss of effectiveness following application. Where wearing quality and appearance are important, these coatings, containing fire-retardant chemicals, are best. The coating should be as thick as practicability and economy permit. Such coatings may be used in place of conventional paints, underground and on the surface, for machinery, cabinets, buildings, furniture and so on.

4. Mastic-base compounds provide tough, long-wearing, chemically-stable protection for use on timbers exposed to heavy wear. Principal applications are on cabinets, mine-rescue and first-aid boxes and similar wood and metal articles. They probably are the best type for use on wood ventilation doors and fire doors.

"Meetings Round-Up"

Industry Groups Assess Current Mining Problems

CONTINUED PROGRESS on many of the coal industry's present-day problems was reported by industry men participating in the several regional and nationwide institute and association meetings held during October and November. As part of its regular service in keeping readers abreast of the latest developments, *Coal Age*

on the following pages covers 10 major meetings at which better operating methods, improved preparation, more effective safety and greater market development were among the topics considered. In these staff-written reports, significant highlights of both papers and discussion are digested and arranged for convenient reading.

42nd National Safety Congress p 77
Indiana Coal Mining Institute p 80
AIME Anthracite Section p 81
National Coal Convention p 82
Coal Exporters Association p 84

Kentucky Mining Institute p 86
AIME-ASME Fuels Conference p 88
W. Va. Institute-AIME Meeting p 90
Illinois Mining Institute p 94
ME-MM Association p 96

Other meetings and industry news in News Round-Up p 117



ORGANIZING FOR SAFETY—William Rachunis (left), USBM; W. A. Haslam, The New River Co.; George J. Titler, UMWA; and Frank B. King, W. Va. Dept. of Mines.



TRAINING, GROUNDING, DUST—H. G. King (left), Jamison Coal & Coke Co.; Dr. J. H. Kelley, Joy Mfg. Co.; L. H. Johnson, USBM; and Arthur Bradbury, Inland Steel Co.

42nd National Safety Congress

How to organize for safety, how to attack roof-fall and haulage accidents, how to improve dust control and some new ideas in grounding practice major topics at annual safety conference.

RECOGNITION OF RECENT PROGRESS in mine safety and discussion of safety problems still to be solved shared the spotlight as over 100 safety-minded representatives of the nation's coal in-

dustry participated in the meetings of the Coal-Mining Section of the National Safety Council, Conrad Hilton Hotel, Chicago, Ill., Oct. 18-20. Delegates from producing companies, the union, state

and federal agencies and manufacturers joined in consideration of roof- and dust-control measures, factors affecting haulage safety, improved grounding for mining equipment and effective promotion of safety training. John M. Reid, general manager, The Hudson Coal Co., Scranton, Pa., and chairman of the Coal Mining Section, conducted the meetings.

In a brief business session, the conferees elected section officers for the coming year, as follows:

Chairman—William J. Schuster, safety manager, Hanna Coal Co., St. Clairsville, Ohio.

(Continued on next page.)



ROOF CONTROL—L. H. Johnson (left), Peabody Coal Co.; Joshua Smith, Eastern Gas & Fuel Associates; W. R. Cunningham, Pa. Dept. of Mines; and E. R. Maize, USBM.



HAULAGE—J. W. Pero (left), Pocahontas Fuel Co. Inc., D. S. Kingery, USBM; E. K. Newman, Wisconsin Steel Coal Mines; J. M. Reid, The Hudson Coal Co.; W. J. Schuster, Hanna Coal Co.; and James Benson, Southern Coal Producers' Association.

First vice chairman—**F. J. Foresman**, Director of industrial relations, Pittsburgh & Midway Coal Mining Co., Pittsburgh, Kan.

Second vice chairman—**Charles R. Ferguson**, safety director, United Mine Workers of America, Washington, D. C.

Secretary—**H. F. Weaver**, chief, Coal Mine Inspection Div., U. S. Bureau of Mines, Washington, D. C.

Gil G. Grieve continues as NSC staff representative to the Coal Mining Section.

At a Tuesday luncheon, jointly sponsored by the Coal Mining, Mining and Cement-and-Quarry Sections, **Ned H. Dearborn**, president, National Safety Council, Chicago, spoke on the humanitarian and moral foundations of safety in brief remarks. **J. T. Ryan Jr.**, president, Mine Safety Appliances Co., Pittsburgh, Pa., was chairman.

Employee training was the theme of the Monday afternoon program, which included a panel presentation of step-by-step procedures in organizing Holmes Safety Association chapters and councils, and a paper on the results obtained through accident-prevention training of

miners and officials, the latter by **Arthur Bradbury**, safety director, Inland Steel Co., Wheelwright, Ky. Leader of the "Holmes" panel was **William Rachunis**, mine safety representative, USBM, Beckley, W. Va. Panel members were **William A. Haslam**, assistant to the vice president, New River Co., Mt. Hope, W. Va.; **Frank B. King**, chief, West Virginia Department of Mines, Charleston, W. Va., and **George J. Titler**, president, District 29, UMWA, Beckley, W. Va.

ORGANIZING SAFETY GROUPS

Accident prevention is an economic necessity, since accident cost frequently is one of the largest expenses in mining except for direct labor, Mr. Rachunis said, in pointing out that organized safety effort has been effective in reducing accidents and that the Holmes Safety Association is a natural rallying point for such organization. After outlining the activities, objectives and early history of the association, Mr. Rachunis, now a full-time organizer and co-ordinator of Holmes activities in southern West Virginia, reported that there now are 12 active councils and 165 active

chapters in various coal-producing states. It is now proposed to extend the program into all mining areas of the country.

Organizing groundwork includes enlisting the co-operation of producers, district and local union officers, and state mining officials. Then the best results will be achieved if perhaps 10 chapters can be organized under a central council in a given mining area. Chapters serve individual mines or localities, thus making it possible to conduct interesting safety competition. The competing mines are grouped with others experiencing similar man-hours of exposure totals. Financing of the program is jointly underwritten by the coal companies and the UMWA locals. Each chapter meeting should have a period set aside for discussing recent accidents with regard to causes and recommendations for eliminating repetitions of these accidents, Mr. Rachunis suggested.

As an example of the benefits to be realized from Holmes efforts, Mr. Rachunis presented data from the Beckley council records, showing that a frequency rate of 55.90 in the 8 mo prior to organization was reduced to 29.80 for the 8 mo following organization.

"Bearing in mind that individual responsibility for safety cannot be forced to any degree upon the employee in this day, the Holmes Safety Chapter offers the very best means of educating all interested parties in the importance of safe practices," Mr. Haslam declared, in presenting the viewpoint of a coal operator who sees the Holmes work as an opportunity for co-ordinating the efforts of government agencies, miners and management. Mr. Haslam noted that each of these parties has a safety program, but unification and co-ordination of all are necessary if the common goal is to be achieved.

Other benefits, Mr. Haslam continued, spring from the fact that constant reminders of the results and causes of accidents are presented at chapter meetings and that such meetings provide a forum for spreading the safety message and promoting safety training.

"Since education seems to be the only method left to us," Mr. Haslam concluded, "I wish to impress upon you . . . that the Holmes Safety Association can be one of the greatest forces in the industry in the promotion of safety."

Percentagewise, the roof-fall toll is rising among the other major causes of mine fatalities, Mr. King said, speaking in support of the formation of Holmes councils and chapters as effective educational outlets in the fight on roof-fall accidents. For this reason, one man from the West Virginia Department of Mines staff has been assigned the full-time duty of assisting in the organization work of the association. Other West Virginia efforts in this direction include the appointment in West Virginia of an accident-prevention commission to review all fatal and non-fatal accidents from 1945 onward, and the establishment of a training program based upon occupations from the data assembled by the commission. So far, 27,000 workers in 1,350 classes throughout West Virginia have

been taught these safety lessons, Mr. King reported.

As an indicator of the need for such training, Mr. King declared that all but one of West Virginia's 41 roof-fall fatalities in the first 7 mo of 1954 could have been prevented by adequate roof support.

"Good physical conditions in and around the mines, laws, codes and safety rules will accomplish only a moderate improvement in preventing injuries—the real improvement comes with training and instilling in each worker a belief in safety," Mr. Titler declared, in his review of union participation in the Holmes program. In January and February, 1954, 14 men were killed in the mines of West Virginia, 12 by falls of roof. Investigations showed that in each instance the roof had been declared sound by both supervisors and men, Mr. Titler related. Sometimes posts are used when crossbars should have been used. Sometimes roof is timbered that should have been taken down. Sometimes the bolting plan is inadequate or is not being followed. It all adds up to bad judgment, and intensified training is one remedy for that.

The Holmes Safety Association promotes interest in safety on a local level, provided the chapters are properly organized and serviced, and the result will be a marked contribution in the reduction of injuries, Mr. Titler continued. The Holmes work also improves labor relations because when management and labor work together on safety they get to know each other better, thus enlarging their areas of co-operation in other matters.

BENEFITS OF TRAINING

In relating Inland Steel's experiences in 100% accident-prevention training at Wheelwright and Price mines, Mr. Bradbury laid his groundwork in the company's record in the 11-yr period from 1942 to 1952, inclusive. In these 11 yr the company made steady safety progress as reflected in the fact that the 1942 rate of 61.44 accidents per million man-hr was reduced to 22.92 accidents per million man-hr in 1952. This was achieved in the face of adverse natural conditions and even though hand methods were replaced by machine mining. This progress is attributed to a well-balanced, active safety program and parallels the pace set by the leading companies in the industry in this respect, Mr. Bradbury said.

The Inland safety philosophy includes the separation of production and safety responsibilities and the sparing of no reasonable effort and expense to keep the mines in the safest possible condition.

Safety incentives have changed with the times, Mr. Bradbury pointed out, and at all times the company has fostered a program of meetings devoted to safety discussions. First aid and mine rescue training are diligently promoted, J-I-T and J-R-T programs of the War Manpower Commission were instituted during World War II, and so on.

However, management felt that still better results were possible, Mr. Bradbury said, and in 1952 the possibility

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of introducing Bureau of Mines accident-prevention training was explored. The organization work, carried through in co-operation with all other interested parties, was completed, and in August, 1952, the training was begun under J. B. Yanity and F. A. Cress, the Bureau's instructors, with 100% participation by company employees. The training was completed in November, 1952, with results as shown in Mr. Bradbury's comparative figures:

	1952	1953
Number of lost-time accidents	50	22
Fatal accidents	1	0
Frequency rate	22.92	9.2
Severity rate	5.38	3.48
Tons per accident	23,314	65,768

We must assume that other features of the general safety program helped in this improvement, but we all are agreed that the greatest contributing factor was the 100% training in accident prevention, Mr. Bradbury concluded.

The Tuesday program included symposiums on the problems of roof-fall accidents at the face and the prevention of haulage accidents. Participating in the discussion of roof problems were Earl R. Maize, mining methods research engineer, USBM, Pittsburgh, Pa.; W. R. Cunningham, mine inspector, Pennsylvania Department of Mines, Johnstown, Pa.; Joshua Smith, safety director, Coal Div., Eastern Gas & Fuel Associates, Mt. Hope, W. Va.; and L. H. Johnson, safety engineer, Peabody Coal Co., Taylorville, Ill.

Panel members in the discussion of haulage accidents were: James Benson, safety director, Southern Coal Producers' Association, Washington, D. C.; J. W. Pero, production manager, Pocahontas Fuel Co., Pocahontas, W. Va.; E. K. Newman, general superintendent, Wisconsin Steel Coal Mines, Benham, Ky., and D. S. Kingery, chief, haulage safety section, USBM, Washington, D. C.

ROOF CONTROL FOR SAFETY

Although fatalities in coal mines in all categories are on a downward trend, the reduction in fatalities from roof falls has not decreased proportionately, Mr. Maize explained, in pointed out that greater effort will have to be expended by all to eliminate the causes of the No. 1 killer. With this need in mind, the Bureau of Mines this year initiated a special study of roof support and has assigned two engineers to the task, Mr. Maize reported. Certain state mining departments also have assigned specialists to the full-time duty of seeking ways to improve roof-fall accident experience. The preliminary work in the Bureau has been confined to study of recent fatalities in search of possible patterns.

In this regard, analysis shows that the smaller the mine the higher the fatality rate, with 35% of the fatalities occurring in mines producing less than 500 tpd

and 65% occurring in mines producing more than 500 tpd. Furthermore, mines employing fewer than 100 men averaged 247 tpd per fatality, while those employing more than 100 men averaged 2,800 tpd per fatality. Whether this is a result of less supervision, lack of a timbering plan or some other reason will require further study, Mr. Maize said. It is believed that an economical, workable roof-support plan can be devised for any mine, Mr. Maize concluded, in stating that if equal attention is given to the design and application of timbering systems as has been given to bolting systems, the result certainly will be maximum reduction in roof-fall injuries.

Mr. Cunningham, a state mine inspector in the bituminous areas of Pennsylvania who has been relieved of all other duties to concentrate on roof-control problems, reported 14 roof-fall fatalities in Pennsylvania bituminous mines in the first 6 mo of 1954, 12 of these in the immediate face area. A disproportionate share of these occurred in mines employing from 5 to 15 men. On neither a tonnage basis nor an exposure basis will these mines carry their share of the load, Mr. Cunningham stated. The responsibility is three-fold: management, employees and inspectors, the latter perhaps having stretched their limits of toleration in efforts not to discriminate against the "little fellow."

Another major shortcoming, Mr. Cunningham explained, is too much dependence upon the judgment of individuals. In virtually every timbering plan, the phrase "more timber where the roof requires" is included. In approving roof-bolting plans, on the other hand, such spot judgment is reduced to an absolute minimum. Why then should not timbered roof receive equal or even stricter consideration, Mr. Cunningham asked.

The campaign against roof-fall accidents appears to be bearing some fruit, in that roof-fall accidents represent 52.4% of all inside accidents so far in 1954 against 70% in 1953, in Pennsylvania bituminous mines, Mr. Cunningham reported.

Speaking on the subject of preventing roof-fall accidents in pillar areas, Mr. Smith confined himself to describing incidents at three Eastern Gas & Fuel mines; namely Grant Town, Keystone and Statesbury No. 8.

At Grant Town (10,000 tpd) in northern West Virginia, a compromise roof-control system is used, consisting of roof-bolting in rooms and breakthroughs as they are driven and conventional timbering on the open-end sides of all pillar lifts. In the past a goodly portion of the roof-fall accidents occurred when the first cut was made in a pillar pocket, but under the new plan the men are protected by roof bolts as the first cut is made and loaded out.

Another important advantage is that pillars may be extracted without interruption to the approved mining plan. Prior to bolting, the top in rooms and breakthrough would set down on the timbers. The block then had to be attacked from the side having least fallen material on the floor, necessitating longer

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BELT CONVEYORS—Fred Kolb (left), district manager, Jeffrey Mfg. Co.; B. L. Waldruff, conveyor engineer, Jeffrey Mfg. Co.; and J. W. Anstead, general manager, Linton Summit Coal Co., retiring institute president.



ROOF SUPPORT—James Westfield (left), assistant director, USBM, Washington, D. C.; Edward Thomas, chief, roof-control section, USBM, College Park, Md.; and John A. Stachura, general superintendent, Enoco Collieries, Inc.

Mining Methods and Safety: Indiana Institute's Themes

VENTILATION and roof control in continuous mining, design and application of underground belt conveyors, safety values in roof-bolting, and the current safety efforts of the U. S. Bureau of Mines were major topics presented to 150 members and guests of the Indiana Coal Mining Institute at the fall meeting of the organization at Vincennes, Ind., Oct. 30. An added feature was the presentation of a new motion picture entitled, "The Story of the United States Bureau of Mines." At the evening dinner, principal speaker was Phil N. Eskew, superintendent of schools, Sullivan, Ind., and toastmaster was Howard T. Batman, general manager, Lynch Coal Operators' Reciprocal Association, Terre Haute, Ind. J. W. Anstead, general manager, Linton Summit Coal Co., Sullivan, Ind., and retiring president of the institute, was chairman at all sessions.

At an afternoon business session, officers for the coming year were elected as follows: president—Alva S. Harris, general manager, Ingle Coal Corp., Elberfeld, Ind.; 1st vice president—John A. Stachura, general superintendent, Enoco Collieries, Inc., Bruceville, Ind.; 2nd vice president—Placide Mayeur, general superintendent, Princeton Mining Co., Princeton, Ind.; and 3rd vice president—Colvin Burk, chief engineer, Viking Coal Corp., Terre Haute, Ind.

Speakers and their subjects at the morning session were John A. Stachura, on ventilation and roof control in continuous mining, and B. L. Waldruff, con-

veyor engineer, Jeffrey Mfg. Co., Columbus, Ohio, on the design and application of modern belt conveyors.

VENTILATION, ROOF SUPPORT IN CONTINUOUS MINING

Three Colmol Type B machines are being successfully used in development and pillar recovery in the Indiana No. 5 seam, Mr. Stachura reported, in leading up to an explanation of the methods employed at Enoco mine. In preparing for a change to continuous mining and pillar recovery, a change to exhaust ventilation was made as the first order of business, Mr. Stachura said. The mine previously had been pressure ventilated. In either case, Indiana state law requires that breakthroughs be made at intervals not exceeding 45 ft.

Maximum velocity and volume with minimum interruptions to flow of air to the face are achieved as follows:

Panel entries are driven in sets of four with all intake air conducted through No. 4 heading in the face area. No. 4 heading is 18 to 20 ft wide and the other three are 16 ft wide. A 10-ft-wide door is installed in the wide heading far enough outby the last open breakthrough to permit the Colmol, the pickup loader and a shuttle car to work at the face with the door closed. The intake air passes through the opening alongside the door and is conducted to the face by a line brattice. Other doors are installed in Headings 2 and 3 and between Headings 1 and 2 outby the last open breakthrough. Breakthroughs are turned from the intake heading and driven across to hole through the other three headings. About 10,000 cfm at the end of the line brattice is necessary to keep the faces clear, Mr. Stachura said.

In fully developed room panels, the four headings become intake airways, and bleeder entries around each panel become returns to provide better ventilation during pillar-drawing operations. Testing devices include aspirator tubes leading from the boring head of the machine back to the operator's safety lamp and continuous methane alarms, the latter now under test.

The machines mine two parallel lifts to make full width, necessitating transfer of the line brattice from one side to the other. This work has been greatly simplified through the use of spad drivers, Mr. Stachura reported, in pointing out that the proper use of booster fans might provide better face ventilation in continuous mining by eliminating curtains altogether.

Roof bolts are installed on 4-ft centers in entries and rooms, and round posts on 5-ft centers are used in pillar workings. The pillar-recovery plans further provide that small stumps be left in place to prevent unexpected slate falls.

In follow-up discussion of his paper, Mr. Stachura reported that recovery is slightly above 90%, and that reasonably good dust control is being achieved in the pillar workings. The continuous-mining product contains 10 to 11% minus 28-mesh fines, compared with 7% minus 28-mesh in conventional mining.

BELT-CONVEYOR DESIGN AND APPLICATION

Using slides to illustrate his remarks, Mr. Waldruff reviewed special design features relating to underground belt conveyors, such as, the overhung discharge, tandem drives, low-height takeup de-

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**INDUSTRY MEETING—
A Special COAL AGE
Staff-Written Report**



PLANNERS, SPEAKERS . . . R. Y. Williams, consulting mining engineer; H. P. Link, mining engineer, Philadelphia & Reading Coal & Iron Co.; G. B. Holland, mining engineer, Jeddo-Highland Coal Co.; Edward Powell, mining engineer, Glen Alden Coal Co.; Fred Klipple, general superintendent, Glen Alden Coal Co.; Floyd Sanders, district manager, Goodman Mfg. Co.; W. W. Everett, vice president, Glen Alden Coal Co.; H. H. Otto, assistant general manager, Hudson Coal Co.; Gordon Smith, Pennsylvania Deputy Secretary of Mines; and Julian Parton, president, Panther Valley Coal Co.

Anthracite Section AIME Discusses Water Problems

WATER PROBLEMS in the anthracite mines was the theme of the annual fall meeting of the Anthracite Section, AIME, held at the Redington Hotel, Wilkes-Barre, Pa., Oct. 26. Over 150 members and guests attended the combined dinner and technical session. H. H. Otto, assistant general manager, The Hudson Coal Co., Scranton, Pa., presided at the technical session which was arranged under the direction of Fred Klipple, general superintendent, Glen Alden Coal Co., Wilkes-Barre, Pa.

The average annual rainfall in Pennsylvania is 40 in; in the Northern anthracite field it is 39 in; in the Eastern Middle field it is 47 in; in the Western Middle field it is 48 in; and in the Southern field it is 49 in, Mr. Otto said in opening the session. And in 1952 rainfall in the area was at an all-time high.

The average annual pumping is 65 billion 850 million ft-gal, costing a total of approximately \$8½ million.

A drainage tunnel from near Conewingo to the anthracite area which would require an estimated 300 to 400 million dollars to develop, would help greatly in relieving the problem, Mr. Otto declared. This tunnel would be 130 mi long, exclusive of laterals necessary to tap the various bodies of water in the mining area.

The time has come when the coal companies no longer can cope with the water problem and the State and Federal governments must step into the picture to save the anthracite industry, Mr. Otto said.

SOUTHERN AND MIDDLE WESTERN FIELDS

Water problems in the Southern and Middle Western Fields were discussed by H. P. Link, mining engineer, Philadelphia & Reading Coal & Iron Co., Philadelphia. As a result of reduced working time in operating mines and the abandonment of mines, the cost per ton of pumping has increased. In many instances pumps had to be installed in abandoned mines to keep water at a level which would not endanger pillars between abandoned and active mines. Deep-well-type pumps have been of great help in handling water because of their lower cost, Mr. Link noted.

In the Middle Western field, water is a more serious problem because flow must be handled from 28 abandoned mines. About 26 tons of water are handled per ton of coal in the Southern field while 50 tons of water are handled per ton of coal in the Western Middle field. To permit operation of nine mines, water had to be handled from 26 abandoned mines. About 40% of all rainfall eventually is pumped in the Western field as compared to 8% in the Southern field. Total pumping capacity is 450,000 gpm or five times the averaged annual pumping rate, Mr. Link said.

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Ditches, backfilling of strip mines, re-locating streams and cleaning existing stream beds are effective methods to prevent mine inflow. But much of the water enters through abandoned areas and must be pumped. In conclusion, Mr. Link said that the handling of water is not a single problem but a series.

EASTERN MIDDLE FIELD

Water problems in the Eastern Middle field were described by G. B. Holland, mining engineer, Jeddo-Highland Coal Co., Jeddo, Pa. Conditions in this field are somewhat different from those in other fields in that the basins have many drainage tunnels and connecting tunnels. These provide an outlet for 70% of the coal beds in the field but much of the remaining coal is below drainage level, Mr. Holland noted.

Many miles of flumes and ditches are in service, backfilling has been done and deep-well pumps have been installed to supplement the drainage tunnels. In the future the field must look forward to mining smaller deposits that are below drainage, Mr. Holland declared.

NORTHERN FIELD

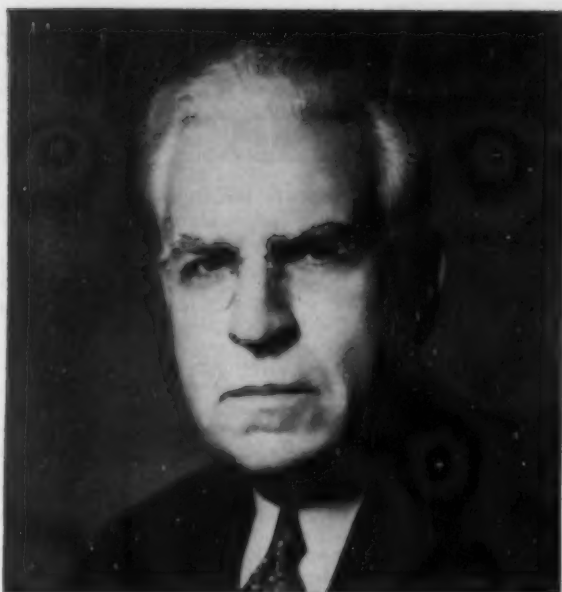
Water problems in the Northern field were discussed by Edward Powell, mining engineer, Glen Alden Coal Co., Wilkes-Barre, Pa. Each year the water situation is becoming more serious although the average annual rainfall is the same and the watershed is the same. In 1953 there were 52.6 tons of water pumped per ton of coal produced while 14 tons were pumped per ton of coal in 1944. This increase in ratio is a result of the decline in tonnage produced in the field.

There are 129 pumping stations with a combined capacity of 750,000 gpm handling water in the Northern field and the quantity of water pumped is twice as much as the other fields combined. The mutual pumping agreement between the producing companies has helped to reduce the cost of pumping and lower the hydraulic head on the barrier pillars, Mr. Powell said.

STATE AID

Commenting on the water situation in general, Gordon Smith, Pennsylvania Deputy Secretary of Mines, said that the water problem is growing at a frightening rate and if the anthracite companies are to stay in business, the water problem must be faced. The first positive move by the state of Pennsylvania was the purchase of seven pumps at a cost of \$440,000. The Department of Mines worked closely with the engineers of the coal companies in selecting the pumps and the sites for installation. The cost of installing the pumps was borne by the coal companies, Mr. Smith said.

Backfilling of stripped areas is another approach used to help reduce the inflow to the mines. Already 19 areas have been restored and 10 more are in the process of restoration. Diverting clean surface water to streams will help not only the coal companies but also will aid in the anti-pollution program, Mr. Smith declared.



With emphasis on market promotion and on relief from burdens resulting from governmental policy and actions, National Coal Association canvasses future market potentials and how to convert them into realities.

CONTINUED IN SERVICE—L. C. Campbell, vice president, Eastern Gas & Fuel Associates, with his re-election as president, heads the list of men returned to NCA office. Others are: vice presidents—Ralph E. Jamison Jr., Jamison Coal & Coke Co.; Walter J. Johnson, Roundup Mining Co.; Hugh B. Lee, Maumee Collieries Co.; and Laurence E. Tierney Jr., Eastern Coal Corp.; treasurer—John L. Kemmerer Jr., Wise Coal & Coke Co.; executive vice president—Tom Pickett; assistant to the president—John D. Battle; secretary and assistant treasurer—Carl C. Crowe.

NCA Builds for Progress

"COAL'S PLACE in our national economy" was the keynote of the 37th anniversary convention and business meeting of the National Coal Association, Pittsburgh, Pa., Nov. 17-18. Development of this theme in both general and workshop sessions was spurred by a message from President Eisenhower, addressed to L. C. Campbell, NCA president, and expressing his hope for an early solution of the industry's problems. Text of the message was:

"To you and the members of your association, I send my hearty greetings on the occasion of its 37th anniversary convention, together with my congratulations on your outstanding contribution to the bituminous coal industry. The problems of your industry are being carefully studied by the government. Through this work, and through the continued vigorous effort of the coal industry itself, I most earnestly hope that genuine and swift progress may be made toward their solution. You have my good wishes for a most successful meeting."

The convention was called to order and presided over by Herbert E. Jones Jr., executive vice president, Amherst Coal Co., Charleston, W. Va., and chairman of the NCA Convention Committee.

The theme of coal's place in the economy and means of strengthening it also prompted three resolutions adopted without opposition. These were:

Market Promotion—"RESOLVED, that the National Coal Association continue its market-promotion activities, through its standing committees, to the end that its sales and engineering services be expanded over broader geographic marketing areas to combat conversions to other fuels and to promote new markets for coal, both on-track and off-track, partic-

INDUSTRY MEETING— A Special COAL AGE Staff-Written Report

ularly in the small industrial fields.

"BE IT FURTHER RESOLVED, that it is the policy of the National Coal Association to continue all institutional promotional activities aiding the retail marketing of coal, except the matching of funds, and that the funds available for matching be used to further, as rapidly as possible, the expansion of sales and engineering programs designed, in cooperation with all segments of the industry, to hold, recapture and expand the markets for coal."

Residual Oil—Pointing to damage inflicted and the need for steps to prevent further damage and maintain the industry's productive ability in the national interest, the association asked "the Congress of the United States and the executive branch of the federal government to take immediate action to curtail the excessive importation of foreign residual oil," and directed the association "to do everything necessary, suitable and proper to accomplish the curtailment of the excessive importation of foreign residual oil."

Coal Policy—To insure careful review and action as soon as possible on certain problems, association members requested that the board of directors meet at the earliest convenient date "to consider and decide industry policy with respect to the following matters: (1) competition with domestically produced natural gas; (2) importation of natural gas; (3) underground storage of natural gas;

(4) excessive imports of residual oil; (5) percentage depletion for all energy fuels; (6) government subsidy of commercial nuclear power; (7) transportation problems, including general freight rates, preferred rates for the government under Sec. 22 of the Interstate Commerce Act, and passenger deficits which add unduly to the burden on coal shippers; (8) problems in the fields of labor and safety; and (9) availability of industry personnel to assist government agencies when called upon. The directors are further requested to review all National Coal Association activities which may contribute to, or may be affected by, government policies and legislation."

COAL TODAY

A growing awareness of coal's place in the national economy in quarters outside the industry is one of the most gratifying developments of the past year, Mr. Campbell declared in opening the first general session, with George H. Love, president, Pittsburgh Consolidation Coal Co., presiding. Clinching his point, Mr. Campbell read President Eisenhower's message quoted earlier in this report.

On coal's place in the energy market, Mr. Campbell stressed the need for a national fuels policy designed to correct the blind, destructive, uneconomic conditions which are destroying the Nation's fuel birthright. Future generations will not applaud the present misapplications of oil and gas when reserves of these essential fuels are gone, Mr. Campbell continued. In spite of these shadows, the long range future of coal never was brighter. Increasing productivity, achieved through skillful engineering, and research in mining, preparation and safety, has placed the industry in a

favorable position to fill the energy needs of the growing Nation.

But our immediate concern, Mr. Campbell declared, is not with coal's bright future. Rather, it is in the industry's present predicament, reflected in curtailed output and vanished profits. The major problems are:

1. Many producers are trying to pay high wages and fringe benefits out of losses, while watching their markets being taken over by large tonnages which reach the customer without such high labor rates and fringe costs.

2. Transportation costs as applied by the carriers and sanctioned by the government have been built into a non-realistic freight-rate structure.

3. Coal has been hurt by unrestricted importation of residual fuel oil, and it is regrettable that efforts to obtain remedial legislation from Congress have not been successful.

4. Natural gas now reaches into every state except Vermont, even though, in view of its limited reserves, it should not be wasted under industrial boilers.

A diligent reappraisal of these problems is called for, Mr. Campbell stated, before turning to some encouraging signs, as follows:

1. The Governors' Fuel Conference promises real progress in developing a course of action.

2. The White House is taking a hand, as shown by the appointment of the 6-member interdepartmental committee headed by Dr. Arthur S. Flemming, director, ODM, to examine the plight of the industry and the various proposals within the area of governmental action.

3. The appointment by President Eisenhower of a committee at cabinet level to deal with public policy respecting energy supply and resources may prove helpful.

A PLAN OF ACTION

Suggesting that the board of directors of NCA meet at the earliest possible date to crystallize an industry viewpoint before the new Congress convenes, Tom Pickett, executive vice president, NCA, Washington, D. C., explained that the effectiveness of the forthcoming results will be dependent upon the degree of unity within the industry. Coal producers neither seek nor expect preferential treatment, Mr. Pickett said, but they do want relief from government restraints and the erasure of advantages conferred on coal's competitors by government policy.

Reviewing NCA's work, Mr. Pickett pointed out that in the field of taxation, representatives of the industry successfully obtained clarification in the 1954 tax-revision bill of the deductibility of royalty payments to the welfare fund as ordinary business expenses, as well as obtaining beneficial changes in the net operating loss deduction. Also, NCA's opposition to the "Time Lag" bill, authorizing railroads to increase freight rates without prior hearing before the ICC, prevented its passage, at least temporarily, and opposition to the importation of foreign residual oil has served to slow down the rate of increase of such deliveries.

Mr. Pickett also noted that NCA services include (1) regular participation before the FPC and state regulatory bodies, (2) constant review of transportation problems and expected future developments, (3) enlargement and improvement of the market-promotion program, (4) efforts to improve the export market, and (5) intensification of NCA's program of education in safety, mining engineering and economics. Furthermore, public-relations functions have been streamlined to improve acceptance of the product and the association's officers will continue to watch legislative developments and competitive situations as they develop, Mr. Pickett concluded.

THE PUBLIC AND COAL

Governor John S. Fine, of the Commonwealth of Pennsylvania, first guest speaker at the Wednesday-afternoon session, stated that the situation in the coal industry has title to the highest priority in the thinking of public officials since, in 1953, second most prosperous year in the nation's history, coal was faced with a shrinking market and unemployment. Progress demands that the industry put its house in order by finding out what is wrong and what must be done. The NCA provides the forum to crystallize coal's efforts along these lines, Governor Fine declared.

Turning to the Governors' Fuel Conference, Governor Fine pointed out that it can be a powerful associate to the industry in pressing for a Congressional program helpful to coal, and it will continue to help as long as coal's program is compatible with public interest.

Several basic proposals which have cropped up in the Governors' Fuel Conference are:

1. Free trade should not mean free exploitation of American industry. Import quotas do not strike a mortal blow at reciprocal trade.

2. Economic statesmanship of the highest order will be necessary to lift the import restrictions imposed by European governments.

3. Restrictions on Canadian natural gas should engage the attention of the next Congress.

These are necessarily short-term expedients while a long-term national fuels policy is being hammered out. On national defense, Governor Fine declared that we are gambling nonchalantly with national security in view of the fact that a longer period will be required in a future emergency to get higher coal production because of the depletion of easily-mined strip coal.

COAL AND STEEL

"If we have war, civilization as we know it will be destroyed," declared Ernest T. Weir, chairman of the board, National Steel Corp. On the other hand, if we can avoid war we stand today at the beginning of a great forward movement in human affairs.

Turning to the interdependence of the coal and steel industries, Mr. Weir stated that the availability of petroleum, natural gas, water power, and even the potential of the atom, do not warrant the neglect of the country's largest known source of

energy. In expressing optimism for the future, Mr. Weir said that except for short periods there is neither too much coal nor too much steel, a fact that is demonstrated in one simple trend, the growth in population. The real long-term problem, for both the coal and steel industries, will be to find the ways and means of sound expansion of production.

In pointing out the importance of the commercial coal industry to steel, Mr. Weir reported that although the figures may vary from year to year the commercial coal industry must provide the steel industry with from 30 to 50% of its coal needs. In this respect the commercial coal industry shares with the steel industry the responsibility for meeting the nation's demand for steel.

BANKING AND COAL

How the banking industry looks at coal was detailed by Sidney B. Congdon, president, The National City Bank of Cleveland, at the second general session Nov. 18, with R. E. Salvati, president, Island Creek Coal Co., presiding. Reviewing the industry picture, Mr. Congdon arrived at this conclusion:

"Coal's large number of producing firms, its difficulties of transportation, its scattered marketing methods and the vagaries of the pricing policies of the industry all have been adverse factors in the fight for markets and for profits.

"Now let us examine quickly the nature of your competition, the oil and gas industries. They are big-money, large-unit businesses, and the methods of transportation which these industries have developed are highly efficient and economical. One pipeline harnesses the output of many producing fields. One company may pour into a market far distant from the source of the product the equivalent of 10,000 tons of coal each 24 hr. Delivery costs are low.

"In oil and gas the small operator has a place in exploration and in the production of the raw product, but speaking broadly he can not refine or market his product by himself. Refining and transport and marketing are of necessity large-unit operations. The small operator in the oil and gas business has little influence on the price which the ultimate consumer pays for the product. The price is fixed by the large-unit marketers.

"With disadvantages such as these to plague you over the years, it is little wonder that your share of the energy market has continued to decline. The decline, admittedly, has come in spite of the splendid accomplishments of your industry in the way of greater efficiency. But there is no glory in a consolation prize. Instead, there is a challenge to resort to more radical cures. Bolder programs are called for. It is time for the exercise of industrial statesmanship of the highest order. In my judgment it is imperative that you look to rapid consolidation and integration of plants, sales and services in the interest of industry stability, good earnings and future growth."

Citing the trend to larger integrated units in all lines of business, Mr. Congdon pointed out that this does not rule

Exporters See Increased Shipments

INDICATIONS that 1954 export totals will reach 15,500,000 tons to nations all over the world and warnings that coal exporters must closely watch developments which might adversely affect their future operations were keynote themes of the annual meeting of the Coal Exporters Association of the United States, Inc., at Pittsburgh, Nov. 17. All officers were reelected, and six association directors were elected to 2-year terms as follows:

S. Pemberton Hutchinson, executive vice president, General Coal Co., Philadelphia, Pa., and association president.

H. A. Damcke, manager of sales, Island Creek Coal Sales Co., New York, N. Y.

D. K. MacKenzie, vice president, Castner, Curran & Bullitt, Inc., New York.

P. F. Masse, vice president, C. H. Sprague & Son Co., Inc., New York.

C. A. Owen, chairman of the board, Imperial Coal Corp., New York.

J. S. Routh, president, Routh Coal Export Corp., New York.

Outlining the functions of the Foreign Operations Administration at the luncheon session, Charles McNaron, chief, Coal and Steel Branch, FOA, explained that the program is designed primarily to service the economic needs of the free nations of the world. Whenever possible, however, the program may also assist American industry if this can be done within the primary mission of the agency. It is planned, Mr. McNaron said, to ship only quality coal and to guard against undue interference with regular commercial channels.

During the past year the exporters association, through its officers, has taken steps to solve some vexing problems, F. F. Estes, executive secretary reported. For example, a committee headed by Mr. Routh has submitted to Dr. Arthur S. Flemming, director, ODM, and chairman of the administration's Interdepartmental Committee, the association's views on (1) license restrictions applied by foreign nations against U. S. coal, (2) stabilization of currency, (3) long-term credit insurance, (4) better equalization between American and foreign vessel rates, (5) designation of the U. S. as the source of supply for coal financed by our government and (6) purchase of U. S. coals by our military for off-shore uses.

Representatives of the association also have had numerous conferences with other interested agencies of the government, Mr. Estes reported, at which the association took the position that foreign governments accord American coals equal treatment with others in importation. To some extent, German restrictions have been eased, but U. S. coals still are not on a parity with coals from England, for example, moving into West Germany. Furthermore, the association has taken a position that all FOA shipments of coal should be in addition to and not in lieu of the tonnage moving in commercial channels.

In looking ahead, Mr. Estes predicted that off-shore coal shipments in 1955 should at least equal those in 1954, although shipments to Canada may be down about 5% as a result of further dieselization of Canadian railroads.

Reviewing the work of the exporters' government-relations committee, Chairman D. T. Buckley, assistant to the president, Castner, Curran & Bullitt, Inc., pointed out that the export coal industry is off the backs of the taxpayers since 95% of the coal moving overseas is financed by free dollars. And a significant change in the past 2 yr shows this coal moving in considerable volume to countries all over the world, an indication that U. S. coal of good quality and reasonable price can be delivered anywhere competitively.

Reciprocal trade should work both ways, Mr. Buckley said, in informing the exporters that the efforts of their representatives have forced closer examination of the wisdom of requiring import licenses by foreign nations.

Turning to the FOA's coal-export program, Mr. Buckley stated that budget cuts have hurt the projected 10,000,000-ton shipment and beclouded the situation. Developments must be closely watched, and exporters must insist that poor quality coal should not be shipped under FOA auspices in competition with high-quality commercial coal. Some thought should be given to the desirability of breaking out some reserve shipping and government interference in the export business should be resisted. Mr. Buckley also explained that while FOA is slated to expire June 30, 1955, it is reasonable to assume that its functions will continue. Therefore, the exporters should be prepared to take a position on reciprocal trade before the House Ways and Means Committee of the new Congress.

out the successful small business. "But," he continued, "there are instances, of which I believe the coal industry is one, where competitive conditions can be met only by consolidation of forces. In my judgment integration in both production and marketing hold the keys to maximum customer service, to reduced costs and, finally, to the ability to compete profitably with your competitive fuels. The realization of a fair profit, as the product of maximum service to the customer at minimum cost, is what we all recognize as the foundation of the American private enterprise system."

The banker, Mr. Congdon concluded, can and must play a role in the integration process. "Mass operations require a mass employment of capital. . . . Once the movement toward greater integration is under way, it will be the function of financial institutions to provide the funds the industry will then need to embrace fully the potentialities of large-scale operations in research, production, transportation, marketing and so on."

POWER FROM COAL

With his text as "Coal and Kilowatts," A. C. Monteith, vice president in charge of engineering, Westinghouse Electric

Corp., noted that "there has been a tremendous amount of conversation and writing about atomic power and its eventual displacement of other sources of energy. It is inevitable that the atom will become important in our way of life. When, in some years from now, more conventional sources of energy begin to disappear, atomic power will be indispensable to our welfare and defense. This day of need for atomic power may not be so far away as might first be suspected depending on the time scale used. Therefore, at Westinghouse we are striving diligently to develop economic, efficient atomic-power generating plants."

"At the same time, we believe that the coming of practical atomic power will be evolutionary, not revolutionary. That is why we are concurrent with our atomic power program, continuing to spend millions of dollars and millions of man-hours in heat-cycle research and in development of better and more efficient power generating equipment for coal-burning plants. Coal today is more essential than ever in helping to provide the nation's need for electric power. It will be even more necessary in the years ahead."

Rising costs of other fuels and ex-

haustion of water-power sites are factors assuring a brighter future for coal in the generation of electricity, this in spite of continuing increases in the efficiency of coal use. "As a matter of fact, the electric-utility market for coal will increase at a slightly lower rate than the rate of electric-utility growth. You may expect to have to supply the electric utilities in 1975 at least three times the coal you sold them in 1954."

"When we consider energy sources available to electric utilities in the near future, atomic power is not a significant factor. Again looking in the crystal ball, it is estimated that in 1963, less than 2% of the power generated will be accounted for by the atom." What about the future—the year 2000? Some authorities have estimated that up to 50% of the power produced will be generated from the atom at that time. "Strange as it may seem, this should not be alarming to the coal industry."

"Between the present time and the year 2000, the electric utility industry will have continued to grow at a tremendous rate. Again, there will be some developments along the line of efficiency of coal burning plants and some other sources of energy still in the picture. But

by the year 2000, the coal industry must be able to produce 6 to 8 times more coal for the electric utility industry than today if it is to meet its responsibilities. This is approximately twice as much as the total coal mined today for all purposes. This, gentlemen, suggests a significant growth potential for the coal industry. It constitutes a tremendous opportunity, as well as a serious responsibility. I am sure the coal industry has initiated thinking which will build toward a capacity capable of supplying such an ultimate demand.

"But this is not all. Let me widen the picture for just a moment to mention some other promising growth areas for coal. Already some of your competitors are turning to coal to supplement their products. The natural gas people are eyeing coal as a raw material source for making gas. And the conversion of coal to chemicals is already under way. In fact, the time may come when mankind will look upon the simple burning of coal as too wasteful of its precious by-products. Indeed, the future of coal abounds with opportunity for growth.

"But this is not to say that along with these market opportunities there will not be serious problems for the coal industry in realizing this growth. Not the least important among them will be the need to make coal more economical and more attractive to use in the electric power field."

Achieving these goals, Mr. Monteith observed, is a joint job for producers of coal and the producers of equipment for mining and using coal. Producer responsibilities include taking all possible steps to cut mining cost, participation in the search for lower transportation costs, and intensified work in preparation to make coal more valuable and convenient to use in utility plants. Manufacturer responsibilities include better equipment not only for more efficient use of coal but for cutting cost and heightening quality at the mine.

"Anything that can be done to make coal more attractive, more economical as a fuel, protects its future and expands its potential markets. Coal will grow in importance as a source of energy for the electric utility industry only as long as it continues to be the most economical fuel. If such a status can be maintained, other fuels will be ruled out and even the advent of nuclear power can be held off. Nuclear power, like anything else, will ultimately have to earn its place in our competitive system on an economic basis."

Re-emphasizing the role of cost in the future growth of coal in generation of electricity, Mr. Monteith concluded that "The co-existence of coal and the atom in the field of electric power generation is neither impossible nor undesirable. What the balance between the two will be in the years to come will depend largely upon the economic advantage one may gain over the other . . . The bright future for coal can be assured if all concerned take positive action toward lower costs and more efficient utilization of coal's energy. The challenge to the coal industry is clear cut. Some realistic, far-reaching planning will have to be

done now if the coal industry is to lay hold of the opportunities the electric utility market offers."

MARKET DEVELOPMENT

Ways and means of building acceptance for coal were the keynotes of the market promotion and public relations luncheon-conference, or workshop session—one of four featuring the final afternoon of the convention. The scope and aims of the association's public-relations work were outlined by Mr. Jamison, and market-promotion plans were presented by M. L. Patton, vice president, Truax-Traer Coal Co., Cincinnati, and chairman of the NCA market-promotion committee.

Coal, said Mr. Jamison, like other industries, "must continue to let people know that it seeks to be progressive and forward-looking, to make only reasonable profits, and to merit and deserve fair treatment." Briefing the way these aims are attained through the operation of the educational section, speakers' bureau, press and publicity section, and paid advertising, Mr. Jamison noted that:

"NCA public-relations efforts are but a spearhead. In some ways we also can supply the working tools, but the major part of our public-relations accomplishment as an industry will depend on the extent to which producer-company executives and their organizations perceive the importance of good public relations and avail themselves of every possible opportunity for their cultivation."

Noting that NCA is the pacesetter in market promotion and public relations in bituminous coal, Mr. Patton pointed to relationship with Bituminous Coal Research and improved liaison with the American Retail Coal Association and the American Coal Sales Association as evidences of growing responsibility in the field of coal marketing. Goals are:

1. Proper burning of coal in modern equipment.
2. Prevention of conversions to other fuels.
3. Effective exploration of opportunities for new markets and new uses by well-organized planning and engineering know-how.

In addition to public relations, including national product-promotion advertising, major marketing activities, each in charge of a strong subcommittee, are: engineering service for both governmental and private applications; collection of market statistics and data; and market promotion—supplying marketing tools and sales-engineering leadership in both off-track and on-track markets.

The present market-promotion program, Mr. Patton noted, was preceded by the establishment, with retailer co-operation, of a "commercial and small industrial plant modernization program" to supply know-how to retail coal men and shipper salesmen.

"Experience showed the value of this program and the need for its expansion. There was a need for an organized effort to seek out boiler rooms needing modernization; sales opportunities for new tonnage in new construction; and talent that could handle any situation in which coal was challenged by competitive fuels.

So, in true colonial pattern, we organized the 'Minute Men' volunteers from among the ranks of retailers, shippers, railroads and boiler room equipment men, all of whom were bound together by a common interest in selling coal and coal burning equipment."

Tools are the numerous sales aids derived from NCA staff experience. The procedure provides for:

1. Survey of heating plants for comparative fuel and related costs.
2. Suggested coal equipment costs and comparative competitive costs.
3. Complete coordinated sales presentations to prospects.

Results are being attained and, said Mr. Patton, the long-pull goals are:

1. A type of engineering service that will save as well as develop markets.
2. Development and training of sales-engineering men who can compete on an even basis with representatives of oil and gas.
3. Building and coordinating sales and marketing aids, and "tools for work" into a "welded force" for selling coal.

MERCHANDISING TODAY

More than a score of producers, sales executives, railroad men and coal-burning equipment manufacturers participated in the general discussion of merchandising needs and progress following the formal committee reports. Major points included the following:

Small packaged plants are necessary to compete with packaged units offered by competition.

Plans and specifications that architects and designers may take and use directly are also a necessity and are being developed. In addition, some hold that the coal supplier or equipment manufacturer must be prepared to take over the heating plant part of the design. Ready-made plans and specifications should be supplemented by operating and general design and specifications manuals.

Cooperation from retailers and manufacturers of equipment is vital in preventing conversions and in getting new installations for coal.

Modern coal and ash-handling equipment that is low in first cost, operating cost and maintenance cost also are vital. Lack of such equipment is a major handicap in getting coal acceptance. However, work is under way looking toward the development and standardization of such equipment.

Getting word of plans for new buildings and plants early is a major factor in keeping coal in the picture, though it does not automatically insure a sale.

And even when advance word is received, there is no assurance that coal will be considered, in turn bringing out the need of a program of keeping the coal story before prospective users or users contemplating changes so that it will receive consideration when the time comes.

The industry's new experimental market-promotion program is getting results, and is being stepped up by building the staff of engineering-service representatives to 12.

Additional funds are a vital need to
(Continued on page 134)

Kentucky Mining Institute Holds 15th Annual Meet

Safety, auger mining, bridge-conveyor mining, roof-bolt recovery, and control of fire hazards with belts high-light meeting at Lexington.



SAFETY—Seated: G. O. Tarleton (left), president, consolidation Coal Co. (Ky.) and institute president; J. T. Parker, manger of coal properties, Inland Steel Co.; S. A. Fox, general manager of northern mines, Blue Diamond Coal Co.; A. D. Sisk, chief, Department of Mines & Minerals; and W. H. Roll, mining engineer, Department of Mines & Minerals; Standing: H. J. Grafton (left), chief mining engineer, Eureka Casualty Co.; C. F. Herbert, safety director, Bituminous Casualty Co.; Arthur Bradbury, safety director, Inland Steel Co.; Charles Ferguson, safety director, UMWA; J. H. Mosgrove, safety director, Big Sandy-Elkhorn Coal Operators' Association; and C. E. Linkous, safety director, Island Creek Coal Co.



AUGER MINING, strip-mine laws, bridge conveyors—Seated: F. P. Kerr (left), general manager, Eastern Coal Corp.; and F. F. Stewart, superintendent, Blair Fork No. 4 mine, Jewell Ridge Coal Corp. Standing: W. J. Simonton (left), Mary Helen Coal Corp.; Guy B. Darst, Benedict Coal Co.; Cecil Sherman, superintendent, Stephens Elkhorn Coal Co., James H. Graham, general mine foreman, Jewell Ridge Coal Corp.; and J. B. Long, president Long Co.

ROOF-BOLT RECOVERY, support of roof for continuous mining, control of rubber belt fire hazards, Piggyback mining, safety, auger mining and Kentucky's strip mine law were subjects at the fifteenth annual meeting of the Kentucky Mining Institute, held at the Phoenix Hotel, Lexington, Nov. 11 and 12.

S. A. Fox, general manager of Northern Mines, Blue Diamond Coal Co., was elected president, succeeding G. O. Tarleton, president, Consolidation Coal Co. (Ky.), who presided over the meeting. Session chairmen were: Mr. Fox; J. T. Parker, manager of coal properties, Inland Steel Co.; F. P. Kerr, general manager, Eastern Coal Corp.; F. F. Stewart, superintendent, Blair Fork No. 4 mine, Jewell Ridge Coal Corp.; H. E. Knight, general superintendent, Bell & Zoller Coal Co., and E. K. Newman, general manager, Wisconsin Steel Mines, International Harvester Co.

William B. Sturgill, secretary, Hazard Coal Operators Association, presided at the luncheon and Bernie Shively, athletic director, University of Kentucky, was speaker. Robert Dickson, director of safety, Kentucky River Mining Institute, presided at the dinner and Justin Wilson, consultant, Coal Operators Casualty Co., was speaker. W. H. Roll, mining engineer, Department of Mines & Minerals, was chairman of the committee which arranged the Lexington program.

SAFETY SYMPOSIUM

The initial session on Thursday afternoon was devoted to a symposium on safety. Lead-off speaker was H. J. Grafton, chief mining engineer, Eureka Casualty Co., who discussed "How to Improve Safety In and Around Small Coal Mines." Based on accident experience at small mines, the following recommendations for improving safety were made: (1) Have mechanical ventilation, (2) examine roof regularly and follow by taking it down or timbering, (3) provide at least two ways out, (4) use only permissible explosives, (5) support power cables properly and remove trailing cables after six temporary splices, (6) use electric cap lamps where gas is present or suspected, (7) first-aid training makes safer workers, (8) if mine is too small for a supervisor, have at least a crew leader responsible for safety and (9) consider following the lead of one locality which has employed one supervisor for a number of small mines.

In discussion of the small mine safety problem, C. F. Herbert, safety director,

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ROOF-BOLT RECOVERY, roof support, belt conveyors, fires and explosions—Seated: H. E. Knight (left), general superintendent, Bell & Zoller Coal Co.; and E. K. Newman, general manager, Wisconsin Steel Mines, International Harvester Co. Standing: J. William Bassett (left), West Kentucky Coal Co.; C. E. Parks, Miners Coal Co.; E. R. Maize, mining methods research engineer, USBM; Frank Perlich, field representative, B. F. Goodrich Co.; and T. James Montgomery, representative, Scandinavia Belting Co.

Bituminous Casualty Corp., said that the closing of nearly 1,500 Kentucky mines or sections during 1953 indicates that inspectors of the Department of Mines & Minerals are on the job. However, he suggested that an increase in inspection personnel would permit an increase in inspections to three per year and get better results in safety. Among the requirements he added to those listed in Mr. Grafton's paper were: (1) rock dust to within 40 ft of the face, (2) provide accurate maps, (3) employ qualified miners and no minors, (4) keep first aid supplies on hand and have a suitable room on the surface for caring for an injured man, and (5) have all mines supervised by a certified foreman.

HOW TRAINING PAYS

Arthur Bradbury, safety director, Island Steel Co., Wheelwright, described "What Accident Prevention Training Did for Our Safety Record." Top benefit was a sudden improvement in frequency rate from 22.92 in 1952 to 9.2 for 1953, apparently as a result of the U. S. Bureau's Accident-Prevention Training Course for Coal Miners and the Bureau's Accident-Prevention Training Course for Mine Officials.

Training of 1,361 employees (100%), including 29 women, was begun in August, 1952, and concluded in November of that year. It was made possible by full co-operation of the local union officials and a remarkable response from the men. Starting in January, 1953, a second course was sponsored to train 88 foremen and company officials.

During the 11-year period when Indiana's coal mines were undergoing a gradual transition from hand loading to complete mechanical, safety was promoted by all known means and frequency dropped from 60 in 1942 to 22.92 in 1952, Mr. Bradbury reported.

"Safety cannot be used as a subterfuge to gain some other end, or as a

whipping boy to protect some selfish interest," was one of the conclusions in a discussion of Mr. Bradbury's paper by Charles Ferguson, safety director, International Union, UMWA. He said the

New Officers Kentucky Mining Institute

President—S. A. Fox, general manager of Northern Mines, Blue Diamond Coal Co., Middlesboro.

Vice Presidents—H. E. Knight, general superintendent, Bell & Zoller Coal Co., Madisonville; F. F. Stewart, superintendent, Blair Fork No. 4 mine, Jewell Ridge Coal Corp., Tilford, and E. F. Milen, superintendent, Eastern Coal Corp., Stone.

Secretary-Treasurer—A. D. Sisk, chief, Department of Mines & Minerals, Lexington.

Directors—Frank Smith, superintendent, Leatherwood Mines, Blue Diamond Coal Co., Leatherwood; G. O. Tarleton, president, Consolidation Coal Co. (Ky.), Jenkins; R. L. Nichols, mine manager, Black Star Coal Corp., Alva; G. M. Patterson, vice president, West Kentucky Coal Co., Madisonville; J. T. Parker, manager of coal properties, Inland Steel Co., Wheelwright; Bradley Sparks, general manager, Duncan Coal Co., Greenville; Douglas F. Crickmer Sr., Pond Creek Colliery, N.W. Ry., South Williamson; C. J. Barton, general superintendent, Kentucky Ridge Coal Co., Field; F. P. Kerr, general manager, Eastern Coal Corp., Stone; E. K. Newman, general manager, Wisconsin Steel Mines, International Harvester Co., Benham; L. A. Hopper, vice president, Columbus Mining Co., Allais; and Norman Yarborough, superintendent, Mines 30 & 31, United States Steel Corp., Lynch.

Bradbury paper supported the following conclusions: (1) money spent for safety is returned ten-fold; (2) safety is primarily the responsibility of management; (3) success in safety requires the full and continuous cooperation of management, labor and Federal and State inspection and enforcement agencies, and (4) complete honesty is necessary in dealing with safety matters.

Necessity for good relations between labor and management to get a good safety program across was emphasized by J. H. Mosgrove, safety director, Big Sandy-Elkhorn Coal Operators' Association, in his paper, "Training For Safety." More complete details of the training program appeared in *Coal Age*, August, 1954, p 130.

"Training can be the greatest force in our industry in obtaining and maintaining safety and safe working conditions," said C. E. Linkous, director of safety, Island Creek Coal Co., in discussing the Mosgrove paper. He emphasized the six "musts" embodied in the Mosgrove paper and summarized them as follows:

"(1) Both labor and management must be convinced that the training will be beneficial and each must provide 100% support; (2) the 'command' approach toward training sessions must be displaced by considerable missionary work and sound reasoning, a suggestion being made that the local union be permitted to 'carry the ball'; (3) supervisors and top management should enter into the classes along with their employees to remove any doubt, if it should exist, that it is a one-sided affair; (4) the instructor must be well versed in his subject and qualified to teach, and he should believe in, and show enthusiasm for, the course he is instructing; (5) classes must be conducted at the convenience of those taking the training, both as to time and location; and (6) recognition must be given and awards made for achievements."

AUGURING EXPERIENCE

A year of experience in auger mining a 4-ft high-grade bottom bench of the Harlan seam was detailed by W. J. Simonton, Mary Helen Coal Corp., Tway, Ky. Production of 100 tons per day is accomplished during dry months but is considerably less during wet periods. Above the coal is 12 to 18 in of laminated coal and dirt which must be kept out of the salable product. The Cardox unit is equipped with a 30-in auger and bores a 35-in hole. Favorable size, texture and quality of the block produced was a surprise.

"As for tonnage, the auger will produce approximately 500 tons per shift," said Guy B. Darst, discussing a combined strip and auger operation in Lee County, Va., on the Benedict Coal Corp.'s property. Principal equipment includes a Compton Model 56 machine with 48-in auger, 2½-yd Lima 1210 shovel, 1-yd Marion 342 shovel, Allis-Chalmers HD20 dozer and Caterpillar 112 Roadgrader.

To move the Compton auger, the largest-size dozer is necessary and for maximum efficiency it would be necessary to have a second dozer so the large

(Continued on p 130)



POLLUTION—co-chairman, T. R. Spicer (left), research professor, fuel technology, Pennsylvania State University, State College, Pa.; H. L. Washburn, research engineer, Pittsburgh Consolidation Coal Co., Library, Pa.; C. W. Gordon, manager, Raymond division, Combustion Engineering, Inc.; Chicago; H. F. Hebley, research consultant, Pittsburgh Consolidation Coal Co., Pittsburgh, Pa.



RESERVES, COKING PROPERTIES, SELECTION—A. H. Brisse (left), chief research engineer, coal and coke, U. S. Steel Corp.; W. H. Tavenner, mining engineer, USBM; F. W. Smith, chief, coal carbonization section, USBM; C. H. Sawyer, research engineer, Eastern Gas & Fuel Associates; and C. L. Potter, research engineer, manager, coal and coke research, Jones & Laughlin Steel Corp.



CONTINUOUS MINING—Morgan Williams (left), general manager, Oglebay Norton Co.; M. A. Shoffner, general manager, Freebrook Corp.; Stephen Canonico, president, Compass Coal Co.; M. H. Forester, vice president, Pittsburgh Consolidation Coal Co.; R. C. Beerbower, Jr., superintendent, Karen mine, U. S. Steel Corp.; and C. B. Tillson, superintendent, Crucible mine, Crucible Steel Co. of America. **PERCY NICHOLLS AWARD**—(right photo) John F. Barkley, chief, fuels utilization branch, USBM, for outstanding service in the solid fuels field.



Better utilization, coking-coal reserves, properties and selection of coking coals discussed at . . .

AIME-ASME Fuels Conference

INDUSTRY MEETING— A Special COAL AGE Staff-Written Report

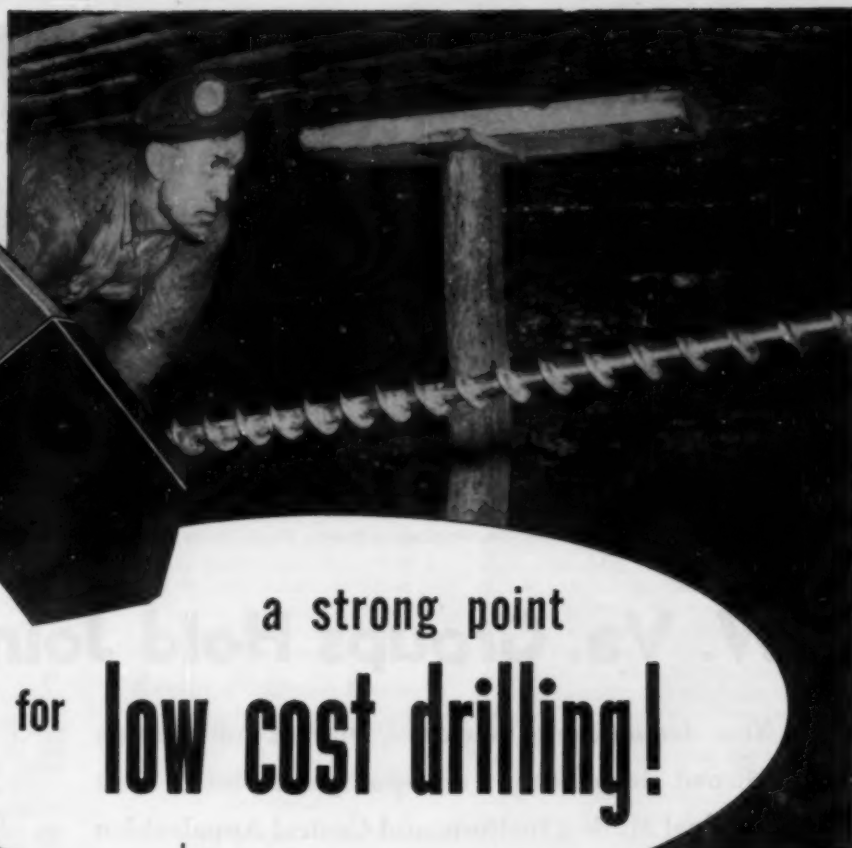
PERFORMANCE of the cyclone furnace has made possible better boiler design, improved operating conditions and reduced air pollution problems; forced-draft chain- and traveling-grate stokers burning southwestern Pennsylvania coals are acceptable on compliance with pollution regulations and are economical to

operate, and recoverable reserves of coking coals are considerably less than original estimates. These are among the views expressed at the 17th annual Joint Fuels Conference, sponsored by the Coal Division, AIME, and the Fuels Division, ASME, at Pittsburgh, Oct. 28. Topics at the meeting on Oct. 29 included pollution problems and operation of continuous miners in the tri-state area.

Other features of the 2-day program included presentation of the Percy Nicholls award for 1954 to John F. Barkley, chief, fuel utilization branch,

USBM, by M. D. Cooper, National Coal Association; luncheon talks by L. F. Reinartz, president, AIME, and L. K. Sillcox, president, ASME. Featured speaker at the Thursday evening dinner was R. L. Ireland, chairman, executive committee, Pittsburgh Consolidation Coal Co., Cleveland, Ohio, on a look from within the coal industry. Speaker at the annual fellowship dinner on Friday night was R. G. Fithian, supervisor of customer relations, Bell Telephone Co., Pittsburgh, on the development of the transistor.

(Continued on p 162)



a strong point
for **low cost drilling!**

12,000 feet of drilling

Kennametal D-1- $\frac{3}{4}$ " Bit delivered this outstanding footage in Coshocton County, Ohio. Bit was reground 40 times, still retained its hard Kennametal Tips.

37 full drilling shifts

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Kennametal drill bits stay sharp longer, are good for 3000 to 7000 feet under normal conditions. Bit reconditioning costs are lower. Substantial savings are made in armature repairs and drill maintenance. Head design assures faster chipping action, provides maximum freedom for cuttings to pass into auger — increased rates of penetration result.

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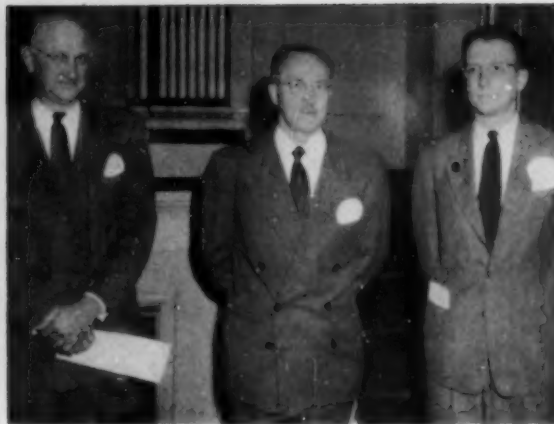
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MINING METHODS AND RESERVES—Seated: E. H. Greenwald (left), Boone County Coal Corp., session chairman; and Jess Redyard, Redyard Coal Co. Standing: W. H. Tavenner (left), U. S. Bureau of Mines; C. O. Carman, Eastern Gas & Fuel Associates; and H. E. Jones Jr., Amherst Coal Co. **PREPARATION AND STREAM POLLUTION** (right photo)—H. O. Zimmerman (left), Inland Steel Co., session chairman; S. A. Braley, Mellon Institute; D. C. Ridenhour, Olga Coal Co.

W. Va. Groups Hold Joint Meet

New deep-mining machines, stream purification and railroad electrification are spotlight topics as West Virginia Coal Mining Institute and Central Appalachian Section, AIME, join in fall meeting

BRIGHT SPOTS FOR COAL in the railroad power picture were indicated by two of the papers presented at a joint meeting of the Central Appalachian Section, AIME, and West Virginia Coal Mining Institute at Hot Springs, Va., Nov. 5-6. Other papers dealt with high-speed roof bolting, disposal of industrial wastes, heavy-media separation, coking coals in Logan and Mingo counties and semi-longwall plow mining.

Session chairmen were R. C. Luther, vice president, Peerless Coal & Coke Co.; R. C. Lazelle, research engineer, Island Creek Coal Co.; H. O. Zimmerman, assistant manager of coal properties, Inland Steel Co.; E. H. Greenwald, general manager, Boone County Coal Corp.; and Jesse Redyard, president, Redyard Coal Co.

At the luncheon, presided over by Rhesa M. Allen, mining engineer, French Coal Co., George Manov, industrial development specialist, Atomic Energy Commission, discussed whether coal and the atom will become partners or competitors. He concluded that the atom will supplement rather than displace coal. He said that in 10 to 15 yr, when the curves representing rising coal costs and falling heat-from-atom costs will cross, the atom may possibly compete with coal, but only in the production of heat. He expressed surprise that the coal industry has not participated in atomic research. At the dinner,

INDUSTRY MEETING— A Special COAL AGE Staff-Written Report

with Mr. Quenon presiding and Fred K. Prosser, coal traffic manager, Norfolk & Western Ry., acting as toastmaster, the guest speaker was Louis A. Pardue, vice president, Virginia Polytechnic Institute.

NEW LIGHT ON RAILROADING

"We are confident that the electrification of railroads is on the threshold of a vigorous revival," said Harry Brown, who read a paper, "Railroad Electrification and the Coal Industry," prepared by John D. Saxe, vice president and chief engineer; Richard L. Kimball, development engineer; and H. F. Brown, consulting engineer, all of Gibbs & Hill, Inc.

The summary and conclusions of the paper stated that railroad electrification offers the following advantages:

To the railroads, "more economical operation of a major sector of their systems and an opportunity to increase coal traffic on their lines."

To the utilities, "the tapping of an undeveloped market with a high load factor and probably some diversity that can be served with a minimum investment."

To the coal industry, "the recapture

of a portion of a market that has been lost by increments to an existing market which is growing and relatively secure."

The authors suggested that coal, railroads and the utilities join forces in a redevelopment of electricity for railroad power. Several changed circumstances and some developments have brought electrification back on the horizon. The rectifier locomotive permits use of the commercial frequency of 60 cycles, making total investment required for electrification only 40 to 55% of that required for the 25-cycle system. Capacity of power systems is now so large that they can handle the unbalance of a single-phase trolley system.

Studies indicate that diesel locomotive maintenance increases very rapidly with age and after a decade exceeds that of a steam locomotive. Economical life of diesels may be less than 20 yr, compared with more than 35 yr for an electric locomotive. Moreover, costs of diesel oil are rising while costs of electric power are dropping. The curves crossed in 1953 and trends indicate that electricity will widen its advantage in the future, the authors said.

That the new experimental coal-burning steam-turbine locomotive "is in regular pool service on the N. & W., is looking good and its future is indeed very bright" were the assuring words of H. L. Scott Jr., N. & W. Ry., in a discussion following presentation of his paper describing the locomotive (for a description, see p 50 of this issue). Drop of efficiency with load has not been nearly as much as was expected.

BOLTING ROOF FASTER

Fifteen new and improved jumbo double-arm, air-articulated roof-bolting machines now are in use in four of his company's seven Scarlet Flame mines in



RAILROADS AND ROOF-BOLTING—Seated: R. C. Luther (left), Peerless Coal & Coke Co., session chairman and new institute president; H. A. Quenon, EG&FA, retiring institute president; and R. G. Lazelle, Island Creek Coal Co. Standing: Prof. C. T. Holland (left), Virginia Polytechnic Institute; M. M. Marchich, Island Creek Coal Co.; H. F. Brown, Gibbs & Hill, Inc.; H. D. Scott Jr., Norfolk & Western Ry.; G. R. Spindler, West Virginia School of Mines.

Logan and Mingo counties, said M. M. Marchich, superintendent, Mine No. 24, Island Creek Coal Co. Describing the machines and outlining the steps in their development, Mr. Marchich reported the following advantages: (1) 30% decrease in tramping time over hand pushcarts; (2) loading and unloading time cut to one-fourth; (3) stopper-positioning time reduced by 50%; (4) time of emptying dust containers reduced by 50%; (5) bolts assembled and tightened while stoppers are drilling, and (6) less fatigue and therefore more desirable work.

In 1952, Island Creek Coal Co. decided to build a machine to prove that a high-speed roof-bolting jumbo could be manufactured, Mr. Marchich explained. At the Holden shop, collapsible arms to hold the stoppers were developed and mounted on a Joy 32-9 timbering machine. To obtain an operating comparison, the arms were equipped with two types of stoppers and two types of dust collectors. This experimental machine reduced roof-bolting cycle time, including tramping, by 25 to 30 min per place but it soon became evident that further improvements could be made.

Cleveland engineers attacked the problem and came up with an air-articulated arm and a dust-collecting system using a stainless steel tube around the drill steel. This tube piped to a venture-type dust collector on the machine. These additions were immediately successful, whereupon Island Creek accepted a proposal from a local distributor, Acme Machinery Co., Williamson, W. Va., to design and build an entirely new jumbo roof bolter incorporating the new arms and dust-collecting system.

The machine is equipped with 100 ft of 1½-in air hose. For operation the hose is connected to a 2-in pipe installed to within 80 ft of the face, Mr. Marchich said. Air requirement for each stopper is 105 cfm; for each dust collector, 20 cfm. Drilling speeds attained have been 27

Groups Name New Leaders

West Virginia Coal Mining Institute

President—R. C. Luther, vice president, Peerless Coal & Coke Co.

Vice presidents—C. E. Hough, president, Randolph Smokeless Coal Co.; C. R. Nailler, president, Christopher Coal Co. Div., Pittsburgh Consolidation Coal Co.; George McCaa, general manager, Jamison Coal & Coke Co.; R. G. Lazelle, research engineer, Island Creek Coal Co.; and S. Dunlap Brady, mining engineer, The Gaulley Co.

Secretary-treasurer—G. R. Spindler, director, School of Mines, West Virginia University.

Central Appalachian Section AIME

Chairman—G. O. Tarleton, president, Consolidation Coal Co. (Ky.).

Vice chairmen—Rhesa M. Allen, mining engineer, French Coal Co.; F. M. Morris, chief engineer, Clinchfield Coal Corp.; and H. O. Zimmerman, assistant manager of coal properties, Inland Steel Co.

Secretary-treasurer—Charles T. Holland, head, Mining Engineering, Virginia Polytechnic Institute.

in per minute in medium shale; 15 in sandy shale. In No. 24 mine, two men of a 13-man crew that loaded 1,058 tons of material have bolted a maximum of 22 places. Immediate top is 10 to 12 in of firm shale and the remainder a coarse sandstone.

Since stoppers are equipped with telescopic legs, the drill steels and dust-collector tubes are stocked in standard

lengths for all sections of No. 24 mine. Sizes for installing bolts 30 to 48 in long are: one hexagonal ¾ x 29-in starter steel, one hexagonal ¾ x 54-in finisher steel and one 1¼ x 23¼-in 18-gage seamless tube. Throwaway drill bits are used—1¼-in starter and 1¼-in finisher. Carbide bits are now on trial.

Stoper arms are 9 ft long, have a swinging radius of 270 deg and enable the machine to bolt places 20 to 22 ft wide with one positioning, Mr. Marchich explained. Air cylinders actuate the arms up and down and screw jacks relieve strain on the arms during drilling. Operators are relieved of hard lifting and pushing. As an average, a two-man crew can set 120 to 130 bolts. Minimum height in which the machine can work is about 44 in, because below that height there would be too many steel and tube changes.

KEEPING STREAMS CLEAN

Water pollution is a complex and elusive problem, said S. A. Braley, senior fellow, Mellon Institute, in his paper titled "Industrial Wastes of the Coal Industry." Direct pollution of the air by burning gob piles has been overcome by placing the waste in thin layers, compacting by rollers and either placing clay between the layers or sealing the sides with compacted clay. Indirect pollution, smoke from burning coal, has been diminished by use of low-volatile coals, high- and low-temperature coke and better firing methods.

Stream pollution from silt in washery waste is easier to overcome than pollution from mine water, Dr. Braley said. With the silt problem, any procedure for clarification is dependent upon the degree of purity required by the governing authority. Among the questions to be settled are: How clean should a stream be, and by what methods will the quantity of suspended and dissolved solids be determined? There are many streams, like the Missouri, in which solids from natural erosion require filtration of the water for almost any purpose, yet those streams support fish life, he said.

Holding discharge of mine water to a uniform rate during the 24 hr of a day was about the only suggestion Dr. Braley offered for handling acid mine water. If pumping is done only on an off-peak power period, the water should be impounded in a pond and released to the stream at a uniform rate. Neutralization is not feasible or economical and mine sealing has accomplished nothing, he asserted.

The big problem of developing standards is a two-way street, and pooling the knowledge of both sides to the controversy usually proves to be the quickest and shortest road to a useful answer, Dr. Braley said. The waste maker should know more about how waste is made, how its discharge is regulated and how the nuisance can be controlled than any person outside the industry, but the stream guardians are the ones best able to determine what a stream can assimilate. "It behooves both parties to share the road and arrive safely at the destination."

(Continued on p 146)

The **2** Best Ways

Method

a

USE THE OLIVER

This method calls for classification by any conventional method of the $-\frac{1}{2}$ " to 0 fines coming from washing operations into two parts: coarse ($-\frac{1}{2}$ " to ± 16 mesh) and fines (± 16 to 0). The coarse is fed to the filter at the normal feed point as indicated on the sketch. Then, feed the fines. In this way, the coarse acts as precoat or filtering medium.

The dewatered end product is the same as the original, the coarse and fines being re-mixed while being discharged. The dry blending problem is thus eliminated.

Method

b

USE THE OLIVER

This method also calls for classification of the $-\frac{1}{2}$ " to 0 coal, the classified products being in two size ranges.

Two end-products are produced with this method: $-\frac{1}{2}$ " to ± 16 from the Horizontal and ± 16 to 0 from the American, both end-products being drier than in Method A.

The choice between the two methods would depend upon use of end-product and character of feed.

TO DEWATER COAL 'FINES'

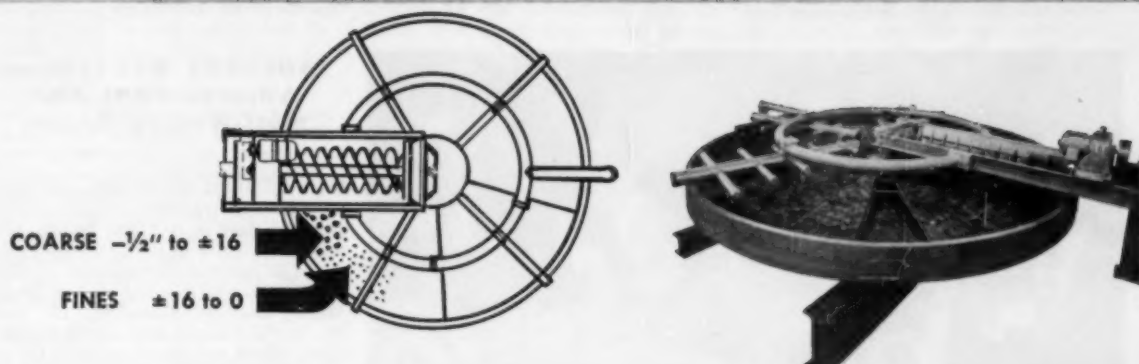
...fines ranging from $-\frac{1}{2}$ " to 0

These two suggested methods for dewatering coal fines make use of one or both of these efficient coal dewaterers. Both produce uniform cake with uniform moisture content. Each produces filtrate suitable for re-use in the washery. Results from installations prove these important points.

The other point worth keeping in mind when considering coal dewaterers is that dewatering is filtering and filtration equipment has been our business since 1907. We have the experience needed to help you in your selection. We have the testing equipment to make tests right in your own washery.

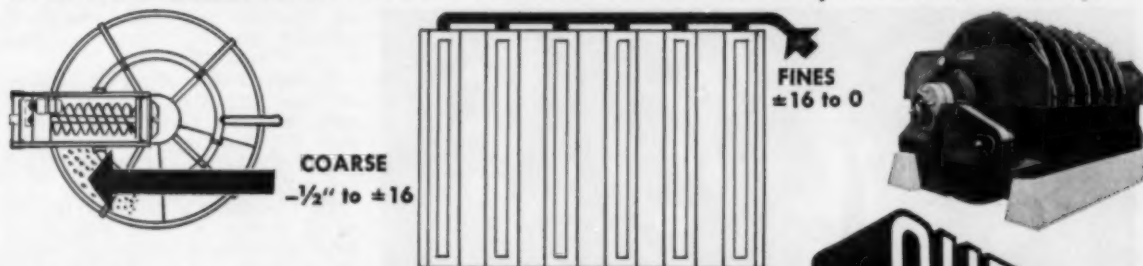
Our nearest office will be glad to send a competent, experienced, coal dewatering engineer to discuss your fines control problem.

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HORIZONTAL FILTER for coarse ($-\frac{1}{2}$ " to ± 16 mesh)

and the AMERICAN DISC TYPE FILTER for fines (± 16 mesh to 0).



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SCHONTHAL HONORS—At left, B. H. Schull, Ill. Dept. of Mines & Minerals, presents silver medallion to B. E. Schonthal in honor of 25 yr of service; right, Mr. Schonthal receives two volumes of testimonial letters from John E. Jones.

Deep Mining, Stripping and Coal Use Provide Illinois Institute Topics



CABLE BELTS, AIR CLEANING, VENTILATION—Gene Moroni (left), Bell & Zoller; W. C. McCulloch, Roberts & Schaefer; D. C. Reilly, Hewitt-Robins, Inc.; and Eugene Nelhaus, Sahara, chairman.



STRIP DRILLING, CLAYS, MARKETS—Murrell Reak (left), Ill. Dept. of Mines & Minerals, chairman; Lafe Stewart, Maumee Collieries; Dr. W. H. Voskull and W. A. White, Ill. Geological Survey.

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

WHAT CAN BE DONE with cable belts, air cleaning, ventilation changes and the study of clays in roof and bottom, plus market prospects in the future, were the topics at the technical sessions marking the 67th annual meeting of the Illinois Mining Institute, Springfield, Ill., Nov. 12. At the business sessions, the institute chose officers and board members for the coming year as follows:

President—J. W. MacDonald, vice president, engineering, Old Ben Coal Corp., W. Frankfort, Ill.

Vice President—F. Earle Snarr, vice president, operations, Chicago, Wilmington & Franklin Coal Co., Chicago.

Secretary-Treasurer—George M. Wilson, geologist and head, educational-extension division, Illinois Geological Survey, Urbana, Ill.

Executive Board—Morris Cunningham, Goodman Mfg. Co.; Oliver M. Evans, Midwest-Radiant Corp.; A. G. Gossard, Snow Hill Coal Corp.; H. C. McCollum, Peabody Coal Co.; and C. Ward Padgett, Bell & Zoller Coal Co.

The educational situation was reported on by Thomas A. Reed, head of the Dept. of Mining & Metallurgy, University of Illinois, and M. D. Cooper, head of the educational division of the National Coal Association. Prof. Reed outlined the status of the scholarships being financed by the institute and by various coal and supply companies and individuals, and reported on enrollment at the university. Mr. Cooper stressed that requirements for entering mining schools are stiffer and urged that all those inter-



ILLINOIS OFFICERS—George M. Wilson (left), Ill. Geological Survey, secretary-treasurer; F. Earle Snarr, Chicago, Wilmington & Franklin Coal Co., vice president; and J. W. MacDonald, Old Ben Coal Corp., president, with Geo. C. McFadden, Carmac Coal Co., banquet toastmaster.

ested in getting young men into engineering check on preparation necessary.

Undergraduates at the University of Illinois and the Missouri School of Mines were guests of the institute at the annual banquet. The banquet speaker was Dr. Kenneth McFarland, whose subject was "Thinkin' Tall." Geo. C. McFadden, Carmac Coal Co., was toastmaster.

Institute members also took time out to honor B. E. Schonthal, head of B. E. Schonthal & Co., for 25 yr of service as secretary-treasurer. The honors included a silver medallion, presented by B. H. Schull, director, Illinois Dept. of Mines and Minerals, and a two-volume set of testimonial letters from institute members, presented by John E. Jones, retired safety engineer, Old Ben Coal Corp.

CABLE BELTS

The development of the cable-belt conveyor in Scotland, its advantages, and how it is being used were outlined by D. C. Reilly, Hewitt-Robins, Inc., Passaic, N. J., to open the morning technical session, with Eugene Neihaus, preparation engineer, Sahara Coal Co., presiding.

In this type of conveyor, the belt is not used as the pulling member. It does nothing but carry and thus can be made light. The belt is moved by wire ropes on each side on which the belt is carried by shoes attached to steel cross members in the belt carcass. The unit, said Mr. Reilly, is especially adapted to long hauls and high lifts, and an installation in Canada will be 3,800 ft long with a lift of 700 ft. With a 42-in belt, it will carry 700 tph at a speed of 400 fpm.

The first experimental unit was used in refuse disposal. Parts of this unit were incorporated into a slope installation at Frances colliery: 2,500 ft long, 572-ft lift, 250 long tons per hour at 250 fpm, 30-in single-ply 32-oz duck belt with $\frac{3}{8}$ -in top cover and $\frac{1}{2}$ -in bottom cover. Four other installations in Scotland and England in 1953-54 included one with an initial length of

1 mi and an ultimate length of 2 mi; initial lift, 260 ft; final lift, 410 ft; 36-in belt of similar construction; 300 lph at 275 fpm with 275-hp motor, $1\frac{1}{4}$ -in ropes.

Some of the installations, said Mr. Reilly, were poorly made under adverse conditions, while others were well made under good conditions. All have given good results, however, with cable life as the major unknown to date. It is expected, though, that life will be 2 to 2½ yr for the average installation. More are going in and Mr. Reilly expressed the belief that this type of conveyor has real promise for long hauls and high lifts in the United States, including overland installations at strip pits.

AIR CLEANING TODAY

The effect of market trends on pneumatic coal cleaning was analyzed by W. C. McCulloch, Roberts & Schaefer Co., to open the institute's discussion of coal preparation. Harking back to his earlier contention that "a percent of moisture is just as detrimental as a percent of ash," Mr. McCulloch came up with this additional declaration: "From the standpoint of cost of delivered Btus, pneumatic cleaning is the most acceptable of all processes."

Noting that delivered cost is based not only on mine cost, but also freight rate, cost of handling both coal and ashes, and the load rating of the boiler plant, and also noting that some authorities have published data indicating that cleaning can be carried too far, Mr. McCulloch offered an example based on a typical central Illinois coal. Starting with cleaning at 1.40 and working back to raw coal, he showed that separation at 1.70 to 1.90 gave the lowest delivered cost in cents per million Btus: 34.1¢ against a low of 34.4¢ on any other basis. "It is in this specific-gravity range that pneumatic cleaning can be used most effectively," he pointed out. Of course, this applies to fine coal only, though some plants handle coal up to 1½ in.

Analyzing air cleaning, Mr. McCulloch pointed out that it cannot clean

wet sizes under $\frac{3}{8}$ in, will not improve surface appearance, puts float with the coal instead of the refuse, will not make a precise cut on a difficult coal, requires presizing to a relatively narrow range, and offers a dust problem.

Advantages include more economical drying of a wet mine product than the product of washing, and a lower percentage of moisture than with wet washing in spite of greater use of water at the face; no freezing in transit, ability of air-cleaned coal to shed water in transit, free flow in handling air-washed coal, highest Btu value for any given coal (particularly in the fine sizes where heavy media is not practicable), greater ease of oil treating, and elimination of stream pollution. Dust collection is simpler than dust collection during heat drying. Low running cost is another advantage, said Mr. McCulloch. Power, labor and maintenance, including refuse disposal, is 4.8¢ a ton in a typical plant.

Noting a trend toward simplification of flowsheets in both steam and metallurgical plants, Mr. McCulloch also pointed out that effective cleaning is obtained down to 48 M with pneumatic equipment. "Air-washed coal may be higher in ash than wet-washed coal, but there is selectivity in sulphur reduction and free pyrites are removed equally well." The final answer on efficiency takes in more than specific gravity, "and it is necessary to enlarge on the familiar washability studies to determine the amenability of coal to the air-washing process. It is desirable, therefore, to conduct pilot-plant runs or carload tests to prove the possibilities."

REVERSING AIR FLOW

Steps and problems involved in reversing air flow from pressure to exhaust at the Buckhorn mine of the Bell & Zoller Coal Co., Johnston City, Ill., were the subject of a paper by Gene Moroni, chief engineer.

Air originally was introduced through a shaft and returned up a slope, and was provided by an 8-ft 125-hp fan, 120,000 cfm, 4-in water gage. Downcast air was split near the shaft bottom. The longer split, in July, 1953, had a length of 41,000 ft and carried 80,000 cfm. Area was 112 sq ft. The development plan provided for a minimum of two intakes and two returns, except at overcast locations. Mining is by room-and-pillar panels.

The pressure system was used until June, 1953, when the change was made to make possible conducting all return air through openings containing no power cables or electrical equipment. The change involved installing a new Jeffrey 8H-60 Aerodyne fan with 75-hp motor, presently delivering 106,000 cfm at a 3-in water gage. Mechanical difficulties in making the change were few. Roof control was the major problem.

Entries originally were developed for 10,000 ft by leaving roof coal supported by wooden crossbars and lagging. Thereafter, top coal was removed and the top was bolted, with bars where necessary.

Before changing ventilation, the en-
(Continued on p 120)



SPEAKERS, OFFICERS—Session chairman and first vice president, J. W. Hunt, (left), associate professor, Pennsylvania State University; G. R. Spindler, director, School of Mines, West Virginia University; James Reilly, vice president, Hanna Coal Co.; president, W. R. Wood, superintendent of maintenance, Berwind-White Coal Mining Co.; R. T. Hair, factory service manager, Joy Mfg. Co.; D. C. Jones, director, Mineral Industries Extension Services, Pennsylvania State University; secretary-treasurer C. L. Brown, electrical engineer, USBM; and third vice president R. S. James, head, development section, USBM, Pittsburgh.

Electro-Mechanical Group Meets

THE FUTURE OF ME-MMA, electrical maintenance, economics of the coal industry and new developments in mining were topics at the second annual meeting of the Mining Electro-Mechanical Maintenance Association, George Washington Hotel, Washington, Pa., Oct. 30. Over 120 members from seven branches attended the technical session and evening banquet.

J. W. Hunt, associate professor, mining extension, Pennsylvania State University, State College, Pa., presided at the technical session, and William Schroeder, partner, Schroeder Bros., Pittsburgh, Pa., presided at the evening banquet. "Rosey" Rosewell, sports broadcaster, Pittsburgh, was principal speaker at the banquet.

Speakers at the afternoon session were W. R. Wood, superintendent of maintenance, Berwind-White Coal Mining Co., Windber, Pa., who delivered the president's address of welcome; D. C. Jones, director, Mineral Industries Extension Services, The Pennsylvania State University, who spoke on "Looking Ahead With ME-MMA"; R. T. Hair, factory service manager, Joy Mfg. Co., Franklin, Pa., who presented "Highlights of Electrical Maintenance"; James Reilly, vice president, Hanna Coal Co., St. Clairsville, Ohio, who talked on "Economics of the Coal Industry"; and G. R. Spindler, director, School of Mines, West Virginia University, Morgantown, W. Va., who discussed "New Developments in Mining."

In discussing the future of ME-MMA, Mr. Jones said that it must be recognized that the organization has been tied into the production of bituminous coal and in the future will also have strong ties with the industry. Although the coal industry is operating at a reduced rate today, mining will continue at a greatly increased rate in the foreseeable future. More machines constantly are being in-

INDUSTRY MEETING— A Special COAL AGE Staff-Written Report

troduced to the industry and the trend toward even more machines can be projected into the future with considerable confidence, Mr. Jones declared.

Equipment will be more specialized and complicated than machines of today and special emphasis will be placed on controls that eliminate the need for manual attention. Men who will maintain the machines of the future will have to be even more highly trained than those of today. The training of both machine operators and maintenance men will become not only a necessity but a requirement for employment, Mr. Jones said.

Specialized training on operation and maintenance undoubtedly will be provided by local, state and federal agencies. With a greater need for vocational training in the future, a greater interest in ME-MMA should result, Mr. Jones added.

Expansion of ME-MMA will depend upon the activity of the members and how well they spread information about the organization. Interest in the organization can be created by: (1) development of news items for publication in the various trade journals; (2) traveling members acquainting mining men in other areas with the objectives of ME-MMA; and (3) development of publications about the organization for distribution to mining men, Mr. Jones declared.

ELECTRICAL MAINTENANCE

Everybody knows that something always is going to break down around a coal mine, explained R. T. Hair, factory

service manager, Joy Mfg. Co., Franklin, Pa., in opening his discussion of temporary expediency vs preventive maintenance. Since it always fails during the production period, somebody must come up with a fast method of getting the machine back in service. In many cases a temporary expedient is used and the machine is damaged, Mr. Hair explained.

The following practices were cited by Mr. Hair as temporary expedients that are harmful to equipment: (1) using the conveyor chain to help pull a shuttle car out of the mud; (2) using the shuttle car to pull timbers; (3) using the conveyor end of a loader as a derrick; (4) mounting different size tires on shuttle cars; (5) supplying the wrong type of oil to a hydraulic system; (6) unmatched threads on hydraulic couplings; (7) improper assembly of hydraulic hose and fittings; (8) using the wrong type of grease; (9) over-lubrication of motor bearings; (10) improper gear alignment; (11) shorting out a mercury delay switch, thus starting motors across the line; (12) bridging out overload relays; (13) improper copper balance in electrical circuits; (14) under-inflation of tires; (15) bumping shuttle cars against the loader; (16) poor cable splicing; (17) plugging motors; (18) welding pieces together when they should be bolted; (19) using two cap screws when more are needed; (20) using bootleg parts; and (21) improper or incomplete lubrication.

Maintenance must be scheduled to repair equipment properly after a temporary expedient has gotten the unit through an emergency, Mr. Hair stated.

COAL-INDUSTRY ECONOMICS

Great savings can be made by meshing a hard-hitting production organization
(Continued on p 142)



"Say, what's wrong with my mine cable?"

"Lots of times we find cable sections like this—necked-down. And that's only one of our troubles. Our cables short out too often. Sometimes jackets creep back from splices. Other times we find broken ground wires. What in thunder are we doing wrong?"

"Well, here's a big part of your trouble:"

"Hourglass sections are a sure sign of too much tension on the cable. So are the other troubles you mention. To end tension . . . keep spring-type shocks at the power source. Keep the reel pulling evenly. Adjust it so there's no back-spooling. Watch out for kinks. And be sure you use a cable that can take it when the going gets tough. Then you'll put an end to your trouble and keep your cables on the job far longer. And remember, one break costs more than the difference in price between a cheap cable and a quality one!"



Be sure with Anaconda's new shuttle car cable

Are cables all alike? No! Quality cables — like ANACONDA's Securityflex* — have proved themselves over the years. Here's why ANACONDA Cables last longer and are safer. The ground wire can stretch more. It will *not* break before the power conductors. *That's a real safety feature.* Jacket is made of a new Neoprene formula. It is stronger. Insulation is long-life, tough cold rubber. It all adds up to real economy in use. Get the full facts from your Anaconda Representative, Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

*Trade Mark

64001

the right cable for the job

ANACONDA®

WIRE AND CABLE

FOREMEN'S FORUM



Here's a checklist you can use to rate your job performance in 1954. Are you a better supervisor than you were a year ago? Will you be even more skillful a year from now?

Year-End Checklist for Foremen

THIS IS A SORT OF INVENTORY, you might say, of how your business of supervision fared in 1954. Did you move ahead or drop back?

We have set down here a few questions designed to probe your performance in several important phases of your job. You will do your own probing and your own evaluating of your 1954 performance, so face the questions bravely and answer them squarely. Be your own severest critic.

YOUR SAFETY PERFORMANCE:

1. Have you had any serious accidents in your section during 1954?
2. Did you study the details of these accidents to the extent that you know why they occurred?
3. Have you taken steps to correct or eliminate the causes?
4. Has your 1954 lost-time accident rate improved over your 1953 rate?

5. Are you really roof conscious?

6. Are you certain your section ventilation, today, is meeting legal requirements?

7. Are you conscientiously supporting the 100% accident-prevention training program at your mine?

8. Do you notice such things as loose clothing, dull tools, bad work habits, makeshift repairs and so on?

9. Do you instantly correct these hazards?

YOUR PRODUCTION EFFORT:

1. Have you a better idea now of what your crew is capable of producing in an average shift?
2. Is your tons-per-man-shift average higher now than a year ago?
3. Have you been able to improve the size consist of the product being loaded out of your section?

4. Have you been able to find improved ways to handle cables, water hoses, line curtains and so on?

5. Did you give the previous problem any thought at all?

6. Have you done anything to streamline the auxiliary operations backing up your loading machine?

7. Have you given this one any thought at all?

YOUR MAINTENANCE QUOTA:

1. Are you now more familiar with the operating characteristics of the machines in your section?
2. Can you direct the proper completion of minor repairs?
3. Do you know the lubrication schedules of the machines in your section?
4. Have you improved at all in your ability to "trouble-shoot" mechanical and electrical troubles?

MORE



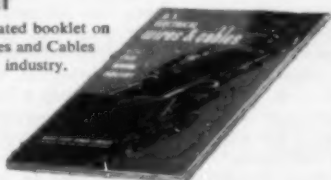
Note excellent flexibility of U.S. Royal Shielded Cables.

There's plenty of "drag miles" in U. S. ROYAL SHIELDED TRAILING CABLES

The constant dragging, flexing, twisting and bruising encountered in heavy service do not bother U.S. Royal Shielded Cables. The rugged jacket contains 60% by weight of neoprene; this jacket is cured in lead—all for more durability, more "drag miles". Consider also more than just the initial cost! Achieve a new low in your cable replacement costs—a new high in performance by specifying U. S. Royal Shielded Trailing Cable, the cable that can take a beating and come back for more.

FREE BOOKLET

Send for free illustrated booklet on U. S. Electrical Wires and Cables for the coal mining industry.



Here's the key to U. S. Royal's great performance; United States Rubber Company is the only electrical wire and cable manufacturer to grow its own natural rubber, manufacture its own synthetic rubber and its own plastics. This means *control of production* every step of the way—resulting in a better and more efficient product.



UNITED STATES RUBBER COMPANY

Electrical Wire and Cable Department • Rockefeller Center, New York 20, N. Y.



RAYMOND MORGAN, fireboss, Acme mine, Truax-Traer Coal Co., Acme, W. Va., wrote this poetic expression of:

The Silence of the Mine

Have you ever mid the day
Stopped and listened, perhaps amazed,
At the silence only found deep in a mine?

It seems to murmur "careful son"
Overhead a million ton,
Could crush and bury even you . . .
yes, anytime . . .

And too, the silence of your host
The strong and faithful oakwood post,
Adds its wonder to the quietness that
prevails.

For days and days it stands so straight
Bracing tons and tons of weight.
In him the miner places trust that seldom
fails . . .

And now the rat comes near to munch
Remaining breadcrumbs from your lunch.
He isn't scared because you, too, are coal-
mine peers.

Feel the far-off mountain bump
"Old Big John" works on a stump
Then the stillness returns gently to your
ears . . .

Off beyond your ray of light
Is the world's most darkest night
Lending omens to the miner's cautious
mind.

For in a mine you travel on
To the spot where your light shone
It's the same, from whence you came,
you're apt to find.

A gust of fresh air seems instilled
With thoughts of others that were killed,
In some far entry, long abandoned with
the times . . .

God may their souls rest there intact
No Mother's prayers can bring 'em back.
They must remain—maintain for always
The silence of the mines.

YEAR-END CHECKLIST . . . cont'd

5. How many armatures have been burned up in your section this year?

6. Is the equipment abused now as much as it was a year ago?

YOUR COST-CUTTING SCORE:

1. Are your total section costs lower than a year ago?

2. Do you keep an itemized breakdown of your section costs either in mind or on paper?

3. Then, do you follow through by making studies of individual operations and services, with the cost of those operations or services at the front of your mind?

4. Have you really been able to reduce the cost of any one of the several face operations?

5. Is the responsibility for cost-control a burden or a challenge to you?

YOUR RATING ON EMPLOYEE-RELATIONS:

1. Does each man on your crew fully understand your mining system and the sequence of face operations?

2. Do you willingly devote time and effort to training new employees in safe work habits?

3. Can you recognize the difference between mere agitation and sincere complaint?

4. Have you kept every promise you made in 1954?

5. Were all your orders clear, concise and complete?

6. Were any jobs fouled up because your orders were misunderstood?

7. Are you reasonably confident at the beginning of a shift that you and your men will turn out a good day's work for the company?

YOUR PERSONAL DEVELOPMENT:

1. Have you become more proficient in handling emergencies?

2. Do you really enjoy reading mining literature and listening to mining talks?

3. Are you more confident of your ability to supervise?

4. Have you developed greater skill in planning your work?

NOW, YOUR VERDICT

Well, what is your verdict? Have you increased in supervisory stature in the past year?

It appears to us that if you now have more confidence in your ability to get a good day's work done in your section, you have increased your supervisory skills to some extent. This new confidence means that you have more or less mastered the routine details of your job and that you have more time and energy to invest in thinking, in looking ahead and in absorbing the lessons your own job can teach you.

But complacency is intolerable. You will either continue to improve as a supervisor or degenerate; there is no in-between.

There is another year coming up, however, which provides a new opportunity for improvement in the event you were forced to answer any of the foregoing checklist questions in a negative manner. As to what you can do to continue your supervisory growth, we offer this . . .

GUIDE FOR THE NEW YEAR

1. **Set goals**—Give yourself a target to shoot at. For example, set a goal of finding and eliminating at least five safety hazards during the first week of the New Year (now only 3 wk away). You say, "How can I find five hazards? The inspectors gave my section a clean bill." That may well be, but we'll wager you still can find five hazards, such as broken rail bonds, faulty switches, dust accumulations along conveyors, overhanging brows and so on. Five? Make it ten!

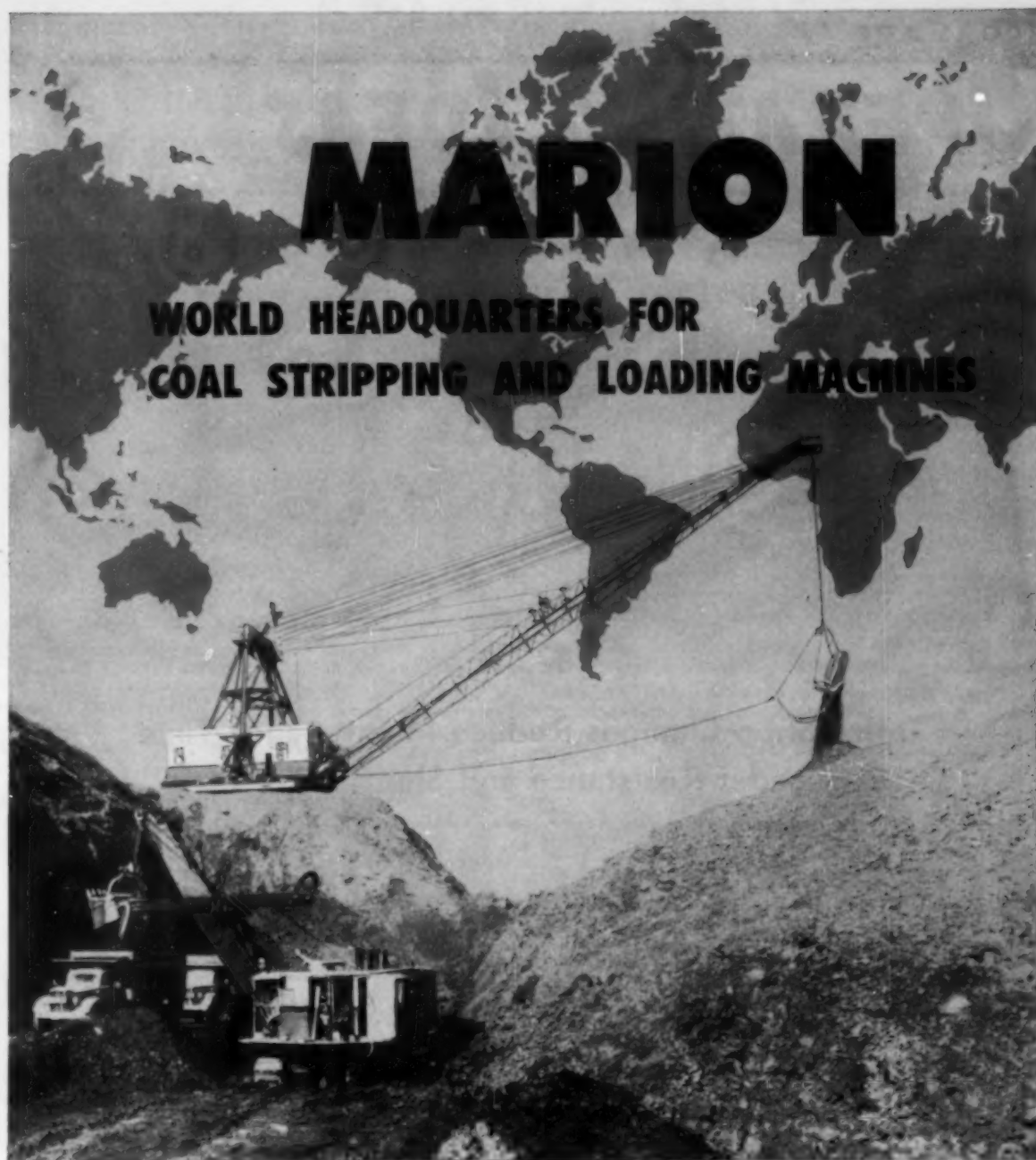
2. **Clean up**—A painting job is not finished until the paintbrush has been cleaned and stored away. A carpentry job is not finished until the sawdust has been swept up and the loaded toolbox is on the carpenter's shoulder. By the same token, a task in a coal mine is not complete until the tools used for the work have been released for the next job. Cultivate the habit of completely finishing any job you start. That means you and your crew. If you don't, you complicate matters for yourself, because the messiness you leave from preceding jobs soon interferes with your current work.

3. **Check performance**—Keep a running account, or operations diary, of the daily incidents and performance in your section. For instance, you might maintain a cumulative total of the man-hours of exposure in your section. Let the men in the crew keep score with you, and you might possibly find that each becomes more conscious of personal safety in his effort to increase the cumulative total.

4. **Study mining technology**—Choose a single subject at a time for concentrated study. Take pains to gather information on the subject and, if necessary, force yourself to read or listen to that information. You will be surprised at the new-found interest you will have in that particular subject and the eagerness with which you search out even more information concerning it. Then move on to another subject. Take rock-dusting, for example. You can find plenty of information on its importance, its distribution, its application, its cost in the mining cycle and the rock-dusting problems still to be solved. You will be better able to evaluate new information on the subject, so your study can be profitable as well as interesting. Then go on to a similar study of lubrication, say.


These are only a few examples of the steps a mine supervisor can take to improve his supervisory ability. In many instances, it is self-imposed measures like these which lead to promotion—a happy thought.

One final ingredient in the recipe for progress is tenacity. Adopting measures like these is one thing, sticking to them is another. Why don't you give them a fair trial for the first 6 mo of 1955?



MARION 7400 Walking Dragline and **MARION 392**
Loading Shovel in action in Pennsylvania.



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POWER SHOVELS FROM $\frac{1}{2}$ TO 60 CUBIC YARDS
PILE DRIVERS • WALKING DRAGLINES



DRAGLINES • CLAMSHELLS • CRANES • BACKHOES
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OPERATING IDEAS



LOADER RESISTANCE (light-colored square end plate) now is readily accessible through hole in back of contactor case. Guyan Eagle Shop Supervisors—Wayne Myers (left), general shop foreman, and Riley Samples, assistant foreman.

Mine-Shop Changes Reduce Maintenance Time On Loader Resistance and Shuttle-Car Chain

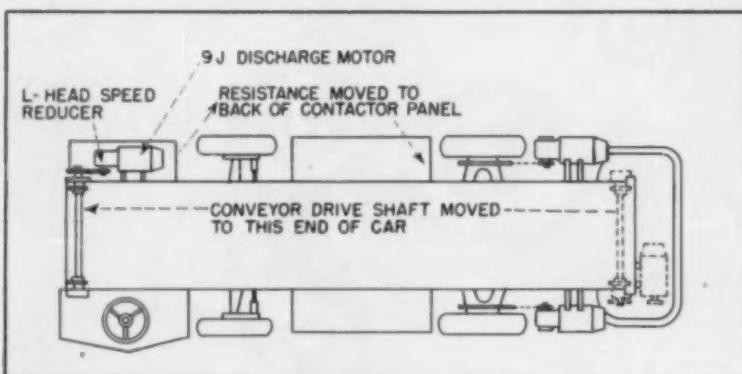
BOTH THE COSTS and difficulties involved in maintaining shuttle cars and loading machines at mines of the Guyan Eagle Coal Co., Amherstdale, W. Va., have been reduced by a company-originated change in the design of each machine. The revisions are made as the units get a general overhaul in Guyan Eagle's central shop.

More Accessible Resistance Cuts Replacement Time

With the original design, two men working one shift was the usual labor required to change a resistance on a 14-BU-3PE loader. Now after a simple alteration to the machine, one man alone can change a resistance in 2 hr. Another advantage lies in the fact that a resistance now can be changed at the face or in the section without the need for sufficient roof height to permit raising the boom to its maximum elevation, as formerly.

In the new arrangement, the resistance is changed through the contactor case on the left side or, in other words, the side opposite the operator's controls. To provide this access, a 7x11-in hole is cut through the main frame web which forms the back of the case.

To change a resistance in the mine, the case cover is taken off and the panel swung out on its hinges, which gives access to the cap screws securing the



MOVING CHAIN DRIVE on shuttle car from original position (broken lines, right) to unloading end (left) changed slack from top to bottom of conveyor run.

unit. After they are loosened, the resistance is pulled out through the hole.

Moving Shuttle-Car Conveyor Chain Eases Maintenance

Rebuilding Type 32-E-9 shuttle cars so that slack or looseness of the conveyor chain is in the bottom rather than the top run has reduced both maintenance delays and costs for Guyan Eagle. As shown in the drawing, the revision consists of moving the conveyor drive

shaft to the unloading end of the car and moving the tail shaft to the former drive end.

The same 9J discharge motor is used, but is mounted longitudinally instead of laterally and is connected through an L-head speed reducer that is interchangeable with the type used on the wheel drives. As originally, the conveyor-drive connection is a roller chain. To make room for the 9J motor, the resistance was moved to the back end of the contactor panel.

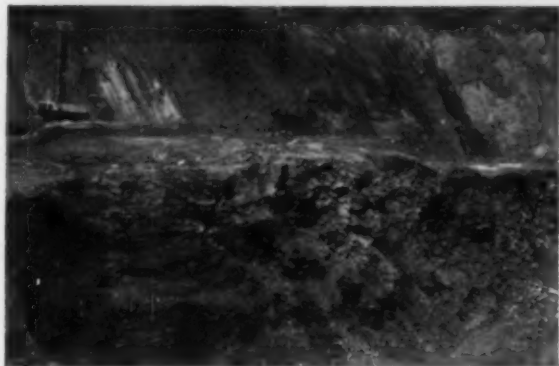
J. Robert Bazley, Inc.

Gets Controlled Breakage with AMERICAN EXPLOSIVES

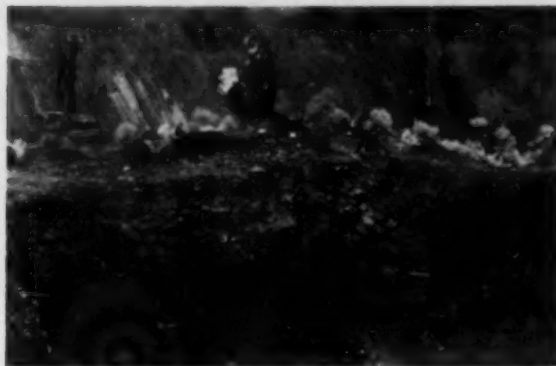
The right American explosives, properly placed and detonated, give mine and quarry operators the kind of controlled, clean breakage that assures efficient and profitable operations.

American Explosives and accessories are

available in a wide range of densities, velocities and strengths to meet every blasting requirement. Plants and magazines in key locations throughout the country can fill your needs, and capable field engineers are available at your call. Make your next order American.



The Lattimer coal stripping, J. Robert Bazley, Inc., Contractor: shaley formation mixed with seams of medium limestone. Fourteen blast holes averaging 71 feet deep drilled in a line 30 feet apart and 30 feet back from open face.



There she goes! Holes were loaded with American Container-Cartridges containing low speed, low sensitivity dynamite, detonated with Plastic Primacord* in each hole and hooked to a trunk line of Plain Primacord.



Notice the heaving, churning motion with which the rock flowed out. Flying rock is notably absent.



This clean, even breakage means easy shoveling and loading —another good shot with American Explosives.

HIGH EXPLOSIVES • PERMISSIBLES •
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Welded Kickback Solves Car-Running Problems

THERE ALWAYS IS SOME IMPROVEMENT you can make, and, as often as not the improvement does not have to be highly dramatic to be a real pay-off item. For example, Henry Ghezzi, outside foreman, Mine No. 40, The Berwind-White Coal Mining Co., Windber, Pa., noted some recurrent troubles in handling empty mine cars as they ran by gravity from the rotary dump onto the kickback to be diverted to the empty-car siding. "Stiff" cars, especially, had a penchant for causing trouble, since they usually came to rest at the switch opening onto the empty track. Following cars on their way from the rotary dump to the kickback would strike these standing cars, with the result that two steel mine cars would have to be rerailed, to say nothing of the time losses and hazards involved.

Mr. Ghezzi ruled out the possibility of using extra men in the area to keep the stiff cars moving. He decided to revamp the kickback and its tributary trackage. His plans included (1) moving the kickback closer to the rotary dump to receive the cars at the point of their greatest momentum and (2) straightening out some kinks in the empty track and at the



STEEL ANGLE SECTIONS provide the framework for this kickback which can be assembled in one man-shift.

switch which previously had slowed down the cars.

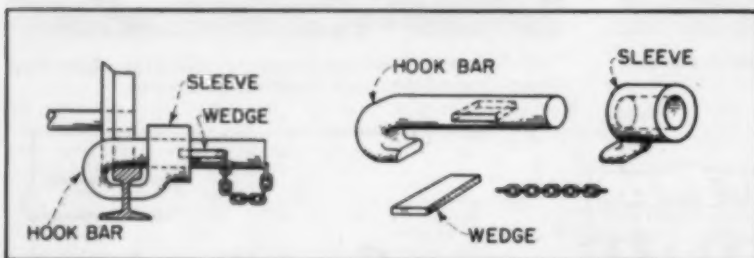
The old kickback had been laid directly on a massive concrete foundation. Duplicating the installation would be a high-cost job today. Mr. Ghezzi therefore designed a steel kickback, as shown in the photo, using angle-iron members to support the inclined rails. The risers are 4 x 1½-in angles, the base and up-

rights are 3½ x 2 and the crossbracing is 2 x 2 in. Plank sleepers on conventional ties support the kickback.

The beauty of the whole job is that the unit was assembled in place in a single shift by one welder. Now car-handling is more efficient, dumping is not delayed and safety is increased since the hazards inherent in rerailing and in pushing stiff cars have been eliminated.

Mounted Maps Easily Marked

A CONVENIENT METHOD of mounting maps of working sections at Jones & Laughlin's Vesta No. 5 mine permits speedy marking of advance at the end of the shift and easy removal for use in a conference. Maps are secured to 24 x 24-in mounting boards which are hung side by side along the wall of the foremen's office where they are easily accessible. For identification, section numbers are marked at the top of each board. Matt Blair, superintendent, is shown inspecting one of the maps removed from the wall.



Car Stop Holds Low Cars

A NEW IMPROVED locking-type car stop, designed and patented by Albert H. Genter, Mt. Lebanon, Pa., prevents car runaways that often result from accidental dislodging of a non-locking type of device. Designed so that it does not

protrude above the rails sufficiently to engage any part of the car but the wheel, the car stop is especially adaptable for use with low wide cars.

Main elements of the stop are the hook-bar member, the sleeve and the

wedge. The hook bar consists of a 2-in-diameter cylindrical stem which rests transversely across the ball of the rail and bears against the web. The stem has a slot through which a wedge is placed to secure the stop in position. The sleeve section is designed to slide over the stem and also is provided with a hook which fits against the opposite side of the rail web.

The wedge is made of flat plate material and is tapered on one edge to permit easy tightening or loosening of the stop. To prevent it from being lost when the stop is removed, it is connected to the hook bar section with a short length of chain.

The stop is mounted with the stem extending to the outer side of the track so that it can be readily mounted or easily removed by a hammer blow on the end of the wedge.

Another **BIG OUTPUT** Walking Dragline



Here's big news for men engaged in strip mining or heavy-duty construction work—Bucyrus-Erie has added another big-yardage, all-weather dragline to its world-famed "walker" line. You'll find unequalled money-making features in the new 400-W . . . here are some of them.

THREE POWER COMBINATIONS—Your choice of heavy-duty diesel engine, electric power with independent motor-driven drums, and electric power with clutch-operated drums.

EFFICIENT FRONT END—All-welded boom has T-section chord members with tubular bracing for maximum strength, minimum deadweight. Fast filling, clean carrying, quick dumping buckets help assure big output.

LONG WORKING RANGE—Without throwing bucket, material can be moved 405 feet with the 400-W's 200-ft. boom and 7-yd. bucket, 377 feet with the 185-ft.

boom and 8-yd. bucket, and 351 feet with the 170-ft. boom and 9-yd. bucket. Digging depths range up to 135 feet.

RAPID OPERATING CYCLE—Fast hoisting and lowering with powerful air-controlled clutches and brakes . . . rapid acceleration and deceleration of the swing under variable-voltage Ward Leonard control.

EXCEPTIONAL MANEUVERING ABILITY—With exclusive Bucyrus-Erie walking mechanism, the 400-W walks where you want it, when you want it, in good weather or bad, even on ground that's too soft for other machines.

STRONG RIGID BASE—Provides 748 sq. ft. of bearing area for full stability in working and walking.

STURDY MAIN MACHINERY—Is simple in design . . . is arranged for accessibility in servicing and maintenance, and for maximum counterbalancing effect . . . is rigidly held in accurate alignment on deep-section revolving frame.

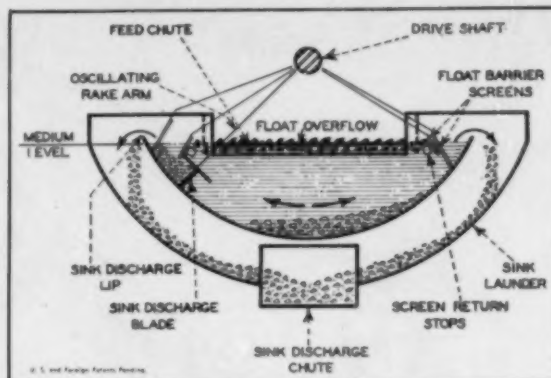
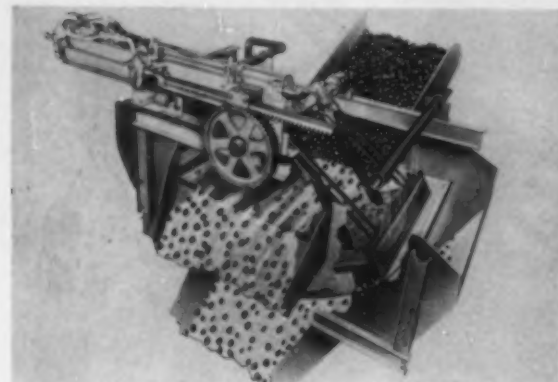
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EQUIPMENT NEWS



Heavy-Media Unit Combines Simplicity and Efficiency (1)

A new-design heavy-media separatory vessel which is said to offer higher efficiency and economy because of its simplified design, low power consumption, efficient sink removal, ready accessibility and easy supervision, has been announced by the Ore & Chemical Corp., Div. of Mining & Milling Machinery, 80 Broad St., New York 4. The unit is available in six basic designs with capacities up to 400 tph and can be operated in tandem to provide 3-product separation.

Among the features cited by the company are: easy installation in minimum headroom and floor space and without heavy foundations because of its slow motion and absence of vibration; simple starting since the vessel is self-draining and no caked medium need be broken loose; reduction in power required, wearing parts and maintenance, with the blade the only moving part; and a hydraulic drive providing a smooth, automatically reversing motion that can be quickly ad-

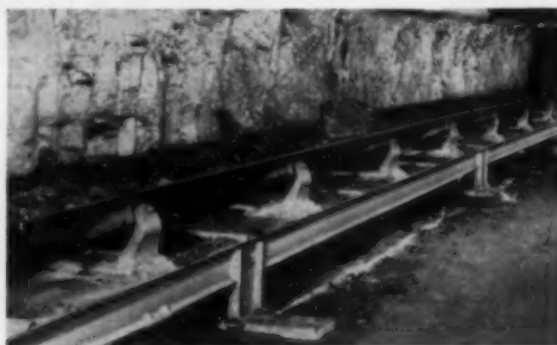
justed for variations in feed. The pool of the OCC vessel has a practically undisturbed surface and density is maintained throughout because the reciprocating motion of the blade prevents eddy currents, undesired turbulence and settling out of medium, the company points out. Product handling is simplified since the elevation of the separated products is substantially that of the feed.

Circle 1 on the postage-free card facing p 112 for literature and details.



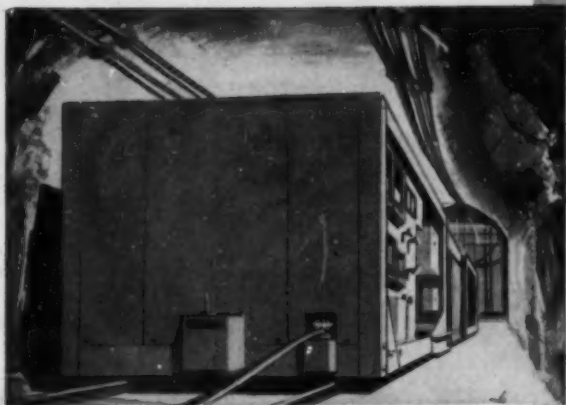
Mine Jeep Holds 12 Easily (2)

The latest addition to the Lee-Norse line, the new Model TJ5 man-trip Jeep will haul 12 men comfortably, the maker reports. Weighing 2,750 lb, the TJ5 is 13 ft 6 in long and 24 in high, with an over-all length of 90 in. Available in track gages from 36 to 48 in, the TJ5 features as standard equipment two 3-hp 250-v DC motors, a double trolley pole on each end, automatic trolley transfer, acceleration timing and improved axle brakes. Full details from Lee-Norse Co., Charleroi, Pa.



Heavy-Duty Belt Conveyor Built for High Tonnages (3)

Its completely new Type 80-A underground belt conveyor for coal and metal mines is designed for heavy duty and high tonnage in mines where the main-haulage system is a semi-permanent or permanent installation, reports the Jeffrey Mfg. Co., Columbus 16, Ohio. The 80-A head section features tandem drive pulleys providing maximum power transmission in



Stationary[▲]
or portable[►]

G-E CABLES

will give you a dependable power supply



When electric cables have to be pulled through water and ice, across sharp rocks, or dragged behind machines, it is important that they be designed to withstand this treatment. Stationary equipment, too, requires a dependable power supply. G-E mining cables have been specifically engineered for the severe operating conditions of the mining industry. Because there's a G-E mine cable designed for each mining job, you can select the proper cable to give longer service for your particular application.

General Electric has prepared a comprehensive catalog of its wire and cable line for the mining industry. You'll find detailed descriptions of power cable, portable cable, aerial cable, drill cord, locomotive cable, control cable, shot firing cord, telephone cable, and magnet wire. In addition, the catalog contains many helpful diagrams and suggestions for proper wiring techniques. Fill in the coupon at the right for your copy.

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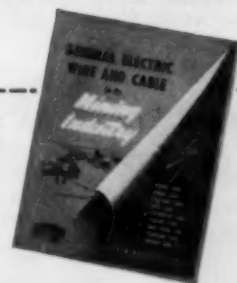
Please send a free copy of "General Electric Wire And Cable for the Mining Industry."

Name

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minimum height and a pneumatic take-up for automatic belt tensioning. The head section is adaptable to motor drives up to 100 hp and provides belt speeds up to 600 fpm. The Type 80-A conveyor frame is built for 30-, 36-, 42- and 48-in belts and 4-, 5- or 6-in-diameter idler rolls. The frame permits choice of a variety of standard idlers, including the new Jeffrey "Permasal" idler with double flexible contact seals, the company points out. The new conveyor supplements the Jeffrey light duty 52-B belt conveyor and an intermediate Type 64-A. Head sections of any type can be combined with frames of any type for gathering, slope or mainline service, it is said. Circle No. 3 on the postage-free card for full details from Jeffrey.



Mine Tractor a Versatile Unit (4)

Its completely new Big "E" unit offers the mining industry for the first time a rubber-tired mine tractor with ample pulling power, required speed and battery capacity for the heaviest of jobs, whether coal haulage or supply or man-trip service, reports the Kersey Mfg. Co., P. O. Box 150, Bluefield, Va. Powered by a high-quality industrial-type battery said to be capable of delivering 6 yr of service with reasonable care, the Big "E" is suitable as a mainline haulage unit for any small mine with long hauls, steep grades and low top, it is said. For larger mechanized mines, it is a versatile, economical unit for handling equipment, supplies and men. It has an over-all height of 24 in and weighs 8,000 lb. Full details from Kersey Mfg. Co.



Aluminum Truck Bodies Boost Load (5)

New line of all-welded aluminum dump-truck bodies offered by the Penn Body Div., Hockensmith Corp., Penn. Pa., reportedly saves almost 50% of the weight of comparable steel structures, to permit greater payloads under legal loading limits. In addition, there is no loss in important strength factors and maintenance costs on an aluminum body are considerably lower, it is said. One of the first products to utilize the increased strength of welded aluminum, made possible by the Aluminum Co. of America's recent development of 5154 aluminum alloy, the Penn body will be available in lengths from 12 to 22 ft, for savings of 1,800 to 3,000 lb, and range in capacity from 10 to 25 cu yd. Aluminum is especially valuable for hauling coal because of its excellent resistance to sulfur compounds, the maker points out. Full details from Penn Body.



Screen Offers Better Results (6)

Simplicity Engineering Co., Durand, Mich., has announced the availability of its W-deck screen on all Simplicity gyrating screens. According to the maker, the W-deck screen permits a more even flow of material across the screen surface, resulting in utilization of more screening area and better screening of materials, with screen life increased by even wear. The W-deck features side- and center-tension take-up only. Maximum opening utilized on the W-deck screen is 2 in, with a maximum wire size of $\frac{3}{4}$ in.

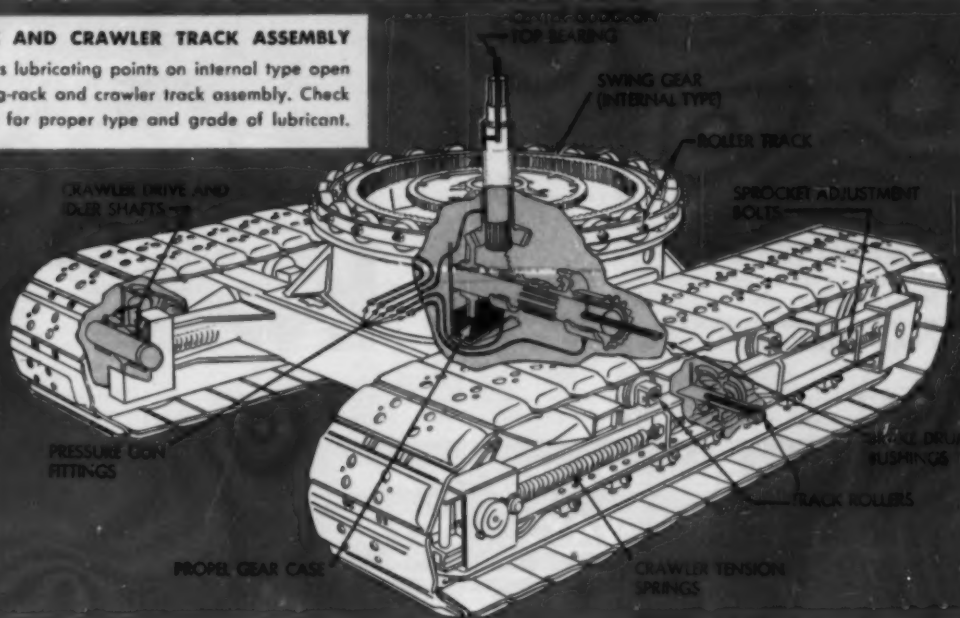


Low-Cost Feeder Has High Capacity (7)

Although capable of capacities of over 300 tph, its new "Redi-Flow" vibrating feeder is nevertheless a lightweight, low-cost unit, a combination made possible by use of a simple and highly effective mechanical vibrating device, reports the Barber-Greene Co., Aurora, Ill. Offered in 20- and 26-in widths for feeding 24- and 30-in belts, respectively, the Redi-Flow handles lumps up to 12 in when mixed with fines and to 8 in maximum when lumps are uniform. The entire feeder and hopper are continuously vibrated by the eccentric action of the counterweighted flywheels, which makes the unit highly effective and also permits accurate regulation of capacity by any of three means, the company points out. Other features cited include maximum belt protection, self-cleaning operation, leakproof feeder pan and use of abrasion-resistant steel. The unit is shipped completely assembled and is easily attached.

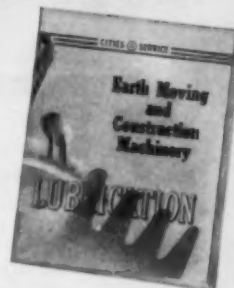
SWING-RACK AND CRAWLER TRACK ASSEMBLY

Illustration shows lubricating points on internal type open gears of a swing-rack and crawler track assembly. Check the chart below for proper type and grade of lubricant.



Where, how and with what to lubricate?

Lubricating procedures and suggested materials discussed on this page represent just one of the many invaluable sections contained in the newest Cities Service EARTH MOVING AND CONSTRUCTION MACHINERY LUBRICATION BOOK. For your FREE copy, write Cities Service Oil Company, Sixty Wall Tower, New York City 5.



FREE: Write today for the EARTH MOVING AND CONSTRUCTION MACHINERY LUBRICATION BOOK.

CITIES SERVICE
QUALITY PETROLEUM PRODUCTS

LUBRICATION OF SWING-RACK AND CRAWLER MECHANISM

Part or Unit	How Lubricated	Lubricant Recommended	Grade No.	
			0°F. to 32°F.	Above 32°F.
CRAWLER MECHANISM— Track rollers, idlers, track wheels, etc. Oliver: Allis-Chalmers:	Track Wheel System Positive Seal Units	Trojan Gear Oil Trojan Grease	#90 P-0	#140 F-0
Others— Grease Lubricated: Oil Lubricated:	{ Pressure gun fittings Pressure gun fittings Hand gun or other means	Trojan Grease Trojan Grease Trojan Gear Oil	A-0 F-3-0 #90	A-1 F-2-0 #90 to #250
GEAR DRIVES— Open: Normal Condition Dusty Condition Enclosed:	By brush or other means By brush or bath Bath	Cisco Compound Raven Oil Trojan Gear Oil	#3-Z #3 #90	#5-Z #7 #140

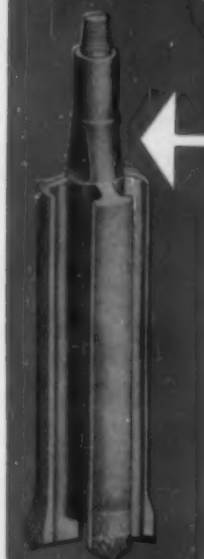
1955 Truck Line Offers 190 Models (8)

Twenty-four series that include 190 models of 1955 Ford trucks ranging from 30-ton tandem-axle "Big Jobs" down to F-100 pickups, all designed for greater durability, more gas economy and lower maintenance expense on every hauling job, have been introduced by the Ford Motor Co., Dearborn, Mich. Ford's five truck engines, built exclusively for the truck lines, include six and V-8 engines and three 1955 engines have increased horsepower and compression ratios. GVW ratings range from 4,000 to 40,000 lb and GCW ratings to 60,000 lb. Among the numerous new features of the 1955 line cited by the company are cabs designed for greater driving ease and efficiency, vacuum-boosted power brakes and varied design improvement in chassis, body and engines.



DRILL LARGE DIAMETER HOLES THE MODERN WAY... WITH

SPANG FABRICATED STAR BITS



Progressive Operators Everywhere Are Discovering This Modern, Better Way Of Drilling Large Diameter Holes.

SPANG FABRICATED STAR BITS replace the conventional, old-style spudding bit and the big hole paddle-type bit. They are made in large diameters for drilling hard formations, and can be dressed, ready for drilling, by hard surfacing quickly and economically, thereby saving the time consumed heating and ramming. Made in a variety of diameters, lengths and weights, with any size joint desired, SPANG Fabricated STAR BITS are your assurance of profitable **big hole** drilling.

**For Extremely Large Diameter Holes
SPANG PILOT-TYPE REAMER BITS ARE RECOMMENDED**

Field performance has amply proved these bits to be the driller's answer to **large hole** problems. They are made special, to your specifications and design, in any diameter; size and weight limited only by the handling capacity of conventional drilling rigs. They can be furnished to run on drilling stem or with integral rope socket top.

For detailed information on SPANG Fabricated STAR BITS and SPANG PILOT-TYPE REAMER BITS for big hole drilling, plus 52 page CATALOG, consult your nearest SPANG DEALER or write direct to



PILOT-TYPE REAMER BIT



SPANG & COMPANY

DEPT. M-1

BUTLER, PENNSYLVANIA

For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Water Wells, Prospect Drilling and Shot Blast Holes.



FLEXIBLE, 2-BEARING IDLER (9)

New Joy "Limberoller" cable-suspension idler for belt conveyors is said to provide a load-conforming catenary and cushioning of the belt, using only two bearings and carrying the belt on resilient, pressure-molded discs of the same size. In continuous contact with the

Kleenslot SCREEN GUARDS



The screen guard is built into the screen and the guard bars permit only the finer particles to pass over the screen. All sizes and most materials furnished.



Cross section at left shows how KLEEN-SLOT Screens operate on a non-clogging principle.

Wedge Wire KLEENSLOT screen guards can be furnished in special sizes to your requirements in practically any type of long wearing metal. They are made to close tolerances like all Wedge Wire products—the width of each wire is held to plus or minus .002 to insure uniform opening width. All Wedge Wire features are embodied in these screen guards and it is to your advantage to consider them from the standpoint that they are non-clogging, non-blinding, strong, rigid uniform and more economical in the long run.

SEND FOR OUR ILLUSTRATED LITERATURE

**Wedge-Wire
CORPORATION**
GAS ST. AT NICKEL PLATE R.R.
WELLINGTON, OHIO

loaded belt, the discs exert a slight gripping action that holds slippage to a minimum and tends to keep the belt aligned. The discs offer excellent resistance to abrasion and will not support combustion. The Limberoller is slot-mounted in special bracketed stands as-

sembled into conveyor sections without bolts or cover sheet and brackets also are available for bolting the idler to any conventional section. The idlers are available for belt widths of 24, 30 and 36 in. Bulletin LD-103 with details from Joy Mfg. Co., Pittsburgh 22, Pa.



Rotary Unit Drills 2,500 Ft of 8-in Hole (10)

A new self-contained, truck-mounted rotary drill employing both compressed air and high-pressure water, known as the Davey Model M7-SA, is said by the maker to be especially efficient for water-well drilling and mineral exploration work. Available in capacities up to 2,500 ft of 8-in hole, the unit is suitable for mounting on any make of truck and features a Davey 500-cfm air compressor and heavy duty duplex-type mud pump, both driven direct from the truck engine by a

heavy duty power take-off. Of tubular open-face box-type construction, 37 ft high, the Model M7-SA mast handles 20-ft drill-pipe sections and is raised and lowered with hydraulic cylinders of 20,000-lb capacity. Dual-drum hoisting assembly provides extra great capacity of line and "pull," the maker points out. All dials and controls are grouped in one place, on an instrument panel at the left rear of the truck. Full details from the Davey Compressor Co., Kent, Ohio.



WET CYCLONES (11)

New Type M DorrClone bridges gap between the smaller 10- and 15-mm Type TM DorrClone and the standard unit. Units are available in either ten 50-mm or twenty 30-mm rubber cyclones in a common housing. Individual cyclones operate in parallel from a common feed chamber and overflow and underflow are combined and discharged from common outlets. At 5 psi operating pressure, the smaller unit will classify 35 gpm while the larger unit will handle 49 gpm. When pressure is raised to 60 psi capacities are increased to 120 and 170 gpm respectively. Information available from The Dorr Co., Barry Place, Stamford, Conn.

MACHINERY STEAM CLEANER (12)

A new line of Hypressure Jenny Steam Cleaners has been announced by the Homestead Valve Mfg. Co., Coraopolis, Pa. Featuring 180 gallons per hour steam cleaning capacity, the units are designed especially for extra-heavy duty



cleaning jobs and for either single- or two-gun operation. Automatic electric ignition and the ability to generate steam-cleaning pressures within two minutes from a cold start is reported to give the units maximum utility. Cleaners are available in oil-fired or gas-fired units in either stationary or portable design.

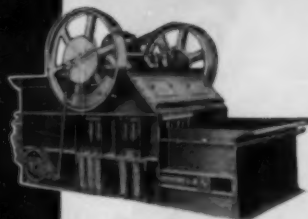


MERCURY-TUBE RECTIFIER (13)

A self-contained and portable mercury-tube rectifier is reported to be the

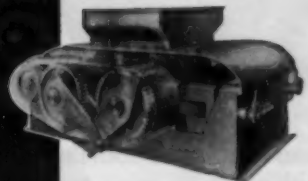
America's most complete line of CRUSHING EQUIPMENT

AVAILABLE FROM STOCK AND FOR SPECIAL ORDER



McNelly Norton Vertical Pick Breaker

50% less fines when reducing lump to egg and stove sizes.



McNelly Double Roll Gearmatic R. O. M. Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating Gearmatic drive.



McNelly Gearmatic Staker Coal Crusher

This unit offers three prime advantages: High volume production, plus accurate sizing, plus low percentage of fines.



McNelly Single Roll Crusher

Universal application. 20", 24" and 36" dia. rolls.

For immediate action on complete information write, wire or call . . .

M^c

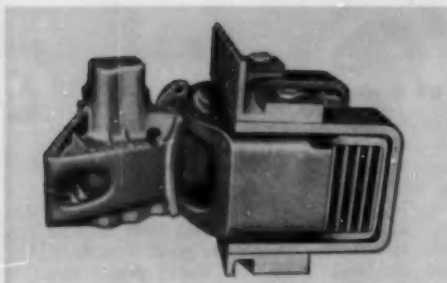
★ Pittsburg, Kansas ★
★ Wellston, Ohio ★

NATIONAL equipment cuts per-ton costs

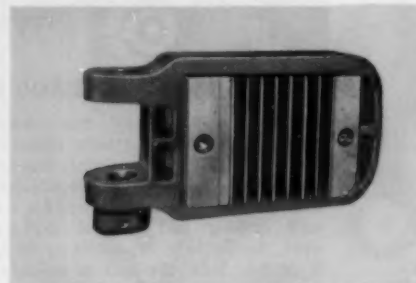
NC-1 MINE CAR TRUCK is the latest example of National's pioneering in better equipment. Among NC-1 truck advantages are longer and softer ride springs, friction damping mechanism that controls vertical and transverse oscillations, automatic frame alignment and cast one-piece bolster with large lubricated center bearing. A-1001



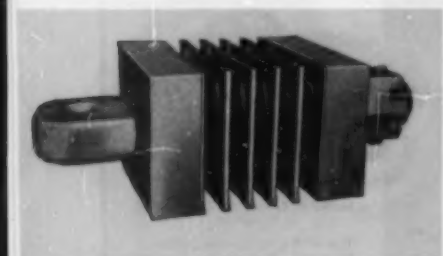
WILLISON AUTOMATIC COUPLERS save time with maximum safety, couple at either end of car or locomotive, require no manual assistance, eliminate damaging slack, permit high speeds with maximum stability.



NATIONAL MI-235 Rubber-Cushioned Draft Gear primarily used in Willison spherical-horn coupler assemblies for drop-bottom cars and locomotives; are effective with link and pin bumpers and in strap yokes.



NATIONAL MI-225 Rubber-Cushioned Draft Gear for locomotives and large capacity cars not required to operate through rotary dump. Give maximum impact protection in minimum space.



NATIONAL MI-230 Rubber-Cushioned Draft Gear for cars in rotary dump service. High-capacity rubber pads with soft initial action provide maximum impact protection, lengthen equipment life. Available in capacities and designs to fit individual requirements.



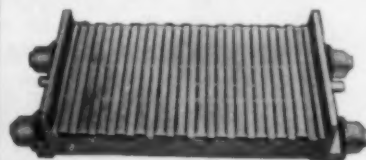
NACO STEEL WHEELS, made from quality-controlled Naco cast steel—of high yield point, great tensile strength and ductility—reduce tread spalling or flange breaking. Available in all sizes regularly used in mining or industrial operations.



NACO STEEL SWIVEL HITCHING AND LINK



CAST ALLOY STEEL ORE-GRINDING BALLS



CAST STEEL PALLET AND MALLIX SINTERING BARS

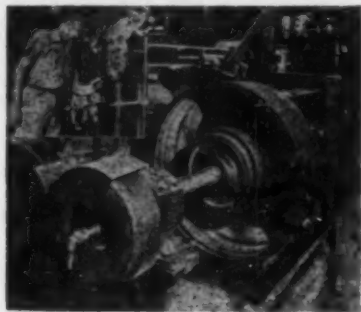
NATIONAL MALLEABLE AND STEEL CASTINGS



COMPANY • Cleveland 6, Ohio

USE THIS CARD

first mercury rectifier that is completely portable and does not require water connections. Using inexpensive all-metal air-cooled Celab tubes, the rectifier is available in 30-, 75- and 150-kw units. Efficiency is said to be over 90%, including the transformers which are self-contained in the same case, and they will withstand 150% overload for 2 hr and 700% overload momentarily. Clark Electronic Laboratories, Box 165, Palm Springs, Calif.



AIR CLUTCH (14)

The new Dodge Air-Grip clutch features quick action, ease of control and sensitivity that permits the partial or full engagement as required. Instantaneous disengagement of the clutch is achieved by use of built-in release valves which are available as optional equipment. Other features include internal ventilation, provision for mechanical engagement in case the air supply fails, compactness and interchangeability with Dodge or other mechanical clutches in existing installations. Units are available in single and double plate models from 8.5 to 806 hp per 100 rpm at 80 psi. Dodge Mfg. Corp., Mishawaka, Ind.

WOUND-ROTOR MOTOR (15)

A new rib-type enclosed, fan-cooled wound-rotor motor, said to be the first to be made with slip rings, brush rigging, rotor and stator inside a single frame, has been announced by the Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. First



A-C explosion-proof wound-rotor motor to bear Underwriter's approval, the new unit is available at 1,800 rpm and slower speeds, in frames 254 to 505, in standard enclosed or explosion-proof construction. The new motor is said to be applicable where very low starting torque, smooth acceleration, jogging or variable adjustable speed dictate the use of a wound-rotor, and where moist, dirty, corrosive or hazardous atmospheres require a totally enclosed motor. Features are described in leaflet 51R8195 available from Allis-Chalmers.

FREE BULLETINS AVAILABLE

(20) **ROOF CONTROL**—Folder 603 describes Bethlehem's yieldable steel mine-roof support, which yields rather than deforms under excessive pressures, thus permitting the surrounding strata to stabilize naturally. It is said to be easy to install, requires minimum maintenance, has a high recovery value and lowers mining costs. Bethlehem Steel Corp., Bethlehem, Pa.

(21) **CYCLONES**—20-p booklet from Heyl & Patterson, Inc., Pittsburgh 22, offers complete data on the design, operation, application and performance of H&P cyclones for the thickening, classifying or recovery of slurry solids. Typical applications at coal-washing plants are discussed in detail with flow-sheets.

(22) **CONVEYOR-BELT CONSTRUCTIONS**—A new color chart permitting easy comparison of standard conveyor-belt constructions is offered by Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia 24. This chart and its accompanying engineering data sheet shows graphically the following characteristics for eight of the most popular ply and material combinations of conveyor-belt construction: theoretical ultimate strength; actual ultimate strength; fastener strength; operating strength with fasteners; operating strength with splice; and troughing index. The properties are expressed in pounds per inch of belt width so that the total strength of a belt may be readily obtained.

YES—I would like more information . . .

Please send me catalogs for further information about the items from the Equipment News Section whose numbers are circled. (December, 1954)

1	5	9	13	17	21	25	29	33	37	41
2	6	10	14	18	22	26	30	34	38	42
3	7	11	15	19	23	27	31	35	39	43
4	8	12	16	20	24	28	32	36	40	

In addition, please send me data on these OTHER products advertised in this issue (give name and page number)

Name (Print) Position

Company

Address

NOT GOOD if mailed after Feb. 1, 1955

(23) **DENSE-MEDIA COAL WASHING**—Bulletin CW-250 entitled "Precision Coal Preparation" provides full information on the Daniels DMS coal-washing system. Offered by the Daniels Co. Contractors, Inc., Indiana, Pa., the bulletin covers the design, installation and operation of the Daniels DMS dense-media washer, with flowsheets, dimension data and typical operating results at various coal plants.

(24) **COAL CRUSHERS**—8-page bulletin offers a complete description of American AC Series coal crushers, with details of construction features including the American-originated shredder ring crushing principle and performance data, capacities, speeds, dimensions. American Pulverizer Co., St. Louis 10, Mo.

(25) **TRACTOR-SHOVEL APPLICATIONS**—Bulletin, "Useful Attachments for 'Payload' Tractor-Shovels," covers 16 attachments available to adapt Hough tractor-shovels to varied tasks in addition to bulk materials handling and earthmoving. Illustrated and described are rotary "V" and trip-blade snow plows, hydraulic back-hoe, backfiller blade, crane hook, lift fork, lumber-log rack, pickup sweeper, cabs, winches, scarifier teeth, land-clearing rake, tine fork, etc. The Frank G. Hough Co., Libertyville, Ill.

(26) **WATER CLARIFICATION**—Bulletin, "Colloidair System for Recovery of Suspended Materials . . . for Waste Water Treatment," is offered by Bulkley, Dunton Processes, Inc., New York 17. According to the maker, Colloidair Separator installations are designed to (1) capture raw materials for return to process, (2) replace or improve efficiency of existing methods of process solids separation, and (3) meet standards for waste flows set by federal, state, regional and county authorities. The catalog features factual data on the efficiency of the process, flow sheets of typical installations, details of operating principles and applications.

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(Sec. 34.9, P.L.&R.)
NEW YORK, N. Y.**BUSINESS REPLY CARD**

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McGraw-Hill Publishing Co., Inc.

THE EDITOR, COAL AGE

330 WEST 42nd STREET

NEW YORK 36, N. Y.

(27) **EXCAVATOR MOVIE**—Two 16-mm color-sound movies featuring material-handling excavators in action are available from the Marion Power Shovel Co., Marion, Ohio. "The Marion 191-M" tells the story of the world's largest shovel on two crawlers, and "Marion and You" features the company's entire line. The films are offered without charge to organizations and companies upon request to the Advertising Dept.

(28) **ADJUSTABLE-SPEED DRIVES**—Detailed data on the principle and use of Dynamatic eddy-current adjustable-speed equipment is offered in 16-p Bulletin GB-2 from Dynamatic Div., Eaton Mfg. Co., Kenosha, Wis. Other Dynamatic included are: Ajusto-Spede drives, liquid- and air-cooled couplings and brakes, Dynaspede stationary field couplings, absorption, motorizing, universal- and variable-frequency dynamometers, press drives and special units. In addition, discussion of basic principles covers eddy-current machinery, torque, heat and operating characteristics, cooling efficiency and control.

(29) **HYDRAULIC DRILL JUMBOS**—Use of hydraulic drill jumbos and power-feed rock drills to increase the percentage of actual drilling time per cycle and footage drilled per shift is discussed in new Bulletin J-100 available from Gardner-Denver Co., Quincy, Ill. A complete line of Gardner-Denver equipment for a wide range of drilling requirements is described.

(30) **MANGANESE STEEL CHAIN**—New bulletin describing the various types of Tisco manganese steel chain, detailed drawings, tables and specifications, is offered by the Taylor-Wharton Iron & Steel Co., High Bridge, N. J. The heavy-duty chain designed for conveyors, elevators, drives, etc., is recommended by the maker for working conditions combining impact and abrasion.

(31) **ENGINE-GENERATOR SETS**—Le Roi "Custom Built" engine-generator sets in seven engine models from 60 to 675 hp, with generators producing from 50 to 350 kw, are fully described in a

new bulletin, with details of features and applications. Le Roi Div., Westinghouse Air Brake Co., Milwaukee 14, Wis.

(32) **PLUG VALVES**—Catalog 5-1954 contains 44 p of data on the ACF line of lubricated plug valves, including full dimension information, design characteristics, operating and application features. Covering a wide range of services, such as, water, air, oil, gasoline, gas, acids, caustic solutions, chemicals and other fluids, the ACF valves include a "Teflon" gasket as a new feature and added improvement. ACF Industries, Inc., New York 8.

(33) **TURBINE PUMPS**—Bulletin 735-1 describes and illustrates the latest models of vertical turbine pumps being manufactured as part of a new line by the Hydraulic Div. of the A. O. Smith Corp., Los Angeles 22, Calif. Included are characteristic curves, design and application data.

(34) **RECTIFIERS**—Bulletin HDR 854 describes various Perkin heavy-duty rectifier installations with ratings up to 500 kw, including a 72-kw magnetic amplifier regulated selenium rectifier. Offered by Perkin Engineering Corp., El Segundo, Calif.

(35) **A PACKING SELECTOR** that the company says is so easy to use that a layman can pick out the right packing for almost any application in a matter of seconds is available from the New York Belting & Packing Co., Passaic, N. J. The selector, a cardboard disk, automatically picks the most economical choice among various packings usable for a particular application, it is said. Shown on the circular selector are packing styles and pressure and temperature readings for the four types of industrial packing applications, gaskets, valve stems and centrifugal and reciprocating pumps, and the various materials to be handled. The reverse side gives the sizes in which the recommended packing is available.

(36) **COMBUSTIBLE GAS ANALYZERS AND ALARMS** in the MSA line are de-

scribed in Booklet 0703-3 offered by Mine Safety Appliances Co., Pittsburgh 8. It covers design and installation of instruments to protect against most of the known combustible gases and vapors.

(37) **CLOSED-CIRCUIT TV**—Folder 3R2436 entitled "How to Read a Blueprint at 500 Ft" tells how closed-circuit television is applied to achieve effective work coordination in 2-way visual communication between widely separated buildings, describes the simplicity and functions of the low-cost "TV EYE" and outlines several applications for closed-circuit TV. Radio Corp. of America, Engineering Products Div., Camden, N. J.

(38) **INSTRUMENTS**—General Catalog 1 covers descriptions and basic specifications of Fischer & Porter complete line of process instrumentation, including instruments for measuring and controlling a wide range of process variables, centralized control panels, data reduction and automation systems, chlorination equipment and industrial glass products. From Fischer & Porter Co., Hatboro, Pa.

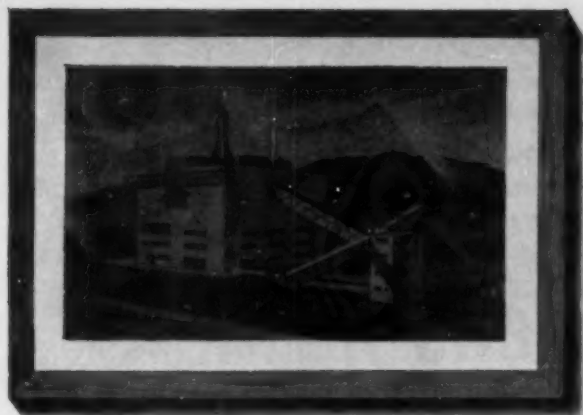
(39) **ROTARY FEEDERS**—Bulletin from Beaumont Birch Co., Philadelphia, Pa., describes in detail the new completely sealed rotary feeder for pressure or vacuum feed and the standard unit employing brass half seals for normal feed. Also covered are Beaumont rotary gates, available in a wide variety of sizes for open and close applications.

(40) **HARDSURFACING ALLOYS**—Bulletin from Coast Metals, Inc., Little Ferry, N. J., covers chemical and physical properties and other engineering data on Coast Metals Nos. 18 and 118, available as a bare rod for gas welding, coated for arc welding, or in cast form, for resistance to wear caused by heat combined with abrasion or impact, steam erosion or other corrosion.

(41) **GEAR SETS**—Selection and ordering information, worm dimensions, gear and spider standards, tool charts and horsepower ratings of standardized Cone-Drive gear sets are contained in 16-p Bulletin 700 available from Cone-Drive Gears Div., Michigan Tool Co., Detroit 12, Mich.

(42) **UNIT HEATERS**—Industrial Unit Heater Association, Detroit 26, Mich., offers two publications. New Bulletin 15, "Piping, Trapping and Venting Steam and Hot Water Unit Heaters," is designed to make the designer's work easier by giving actual diagrams and instructions for making most unit heater installations and includes a table of the most commonly used heat transmission coefficients. Bulletin 12 discusses "The Care and Maintenance of Steam and Hot Water Unit Heaters."

(43) **SPEED-REDUCERS**—28-p Brad Foote Catalog 120 contains revised rating tables for its herringbone and spiral bevel-helical speed-reducer line. In addition to easy-to-read tables, the catalog provides clear, concise instructions for choosing the speed reducer needed, along with simple ordering instructions. Brad Foote Gear Works, Inc., Cicero 50, Ill.



**Whatever your fuel picture,
there's a B&O coal to fit it!**

• In the Baltimore & Ohio area lies a treasure-land of Bituminous—an almost inexhaustible source of low-cost heat and energy. Here are found Bituminous coals of *all varieties*—for power, for coking, for steam, for space heating.

B&O coals are excellent for generating steam in utility and industrial power plants, for steel mills, malleable iron plants, gas plants, lime and brick kilns, cement and glass plants, and potteries.

Whatever your "burning need," Industrial or Domestic, there's a B&O coal to meet it—and we are ready to help you find the best for your purpose. Just ask our man!

**BITUMINOUS COALS
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BALTIMORE & OHIO RAILROAD

Constantly doing things—better!



Capital Spending Plans for 1955 . . .

Here is Good News About Business Prospects

In 1955, American industry is now planning to spend within 5 per cent of the amount it is spending this year on new plant and equipment. This is the tensely awaited result of a check-up just completed by the McGraw-Hill Department of Economics.

Hundreds of companies, by far the largest number in the eight-year history of these McGraw-Hill surveys, cooperated in the check-up. Combined, they represent 29 per cent of all industrial employment and over 60 per cent of employment in the industries where capital investment is highest. Such a broad cross section constitutes

a reliable gauge of the plans of industry as a whole.

What is the meaning of these plans, detailed by the table below, for capital investment next year? Is it good or bad news, so far as it concerns the prospect of continuing prosperity? It is to this crucial question that this editorial is addressed.

Key to Prosperity

It is not only good but very important business news that American industry plans to spend in 1955 almost as much for new plant and equipment as it is spending this year. The reason it is important is that a high level of activity in the capital goods industries is universally recognized as a particularly potent ingredient of prosperity for the nation as a whole. A dollar spent for capital goods is spent again and again for wages and materials. Its stimulating effects, called by economists multiplying effects, move through the economy in much the same way that a pebble tossed into a pond creates a widening circle of ripples. This is one reason why there is such intense business interest in the surveys of plans for capital investment.

Here are the principal reasons why the results of the McGraw-Hill survey are a good omen for continuing prosperity:

PLANS FOR CAPITAL INVESTMENT

	MILLIONS OF DOLLARS			Percent Change 1954- 1955
	1953 ACTUAL*	1954 ESTIMATED*	1955 PLANNED	
All Manufacturing	\$10,026	\$ 9,249	\$ 8,598	-7%
Petroleum Industry†	4,600	4,875	4,920	+1
Mining	506	380	311	-18
Railroads	1,312	851	769	-10
Other Transportation and Communications	2,954	2,922	2,640	-10
Electric and Gas Utilities	4,548	4,274	4,206	-2
ALL INDUSTRY	23,271	21,784	20,727	-5

*United States Department of Commerce; Chase National Bank; McGraw-Hill Department of Economics

†Petroleum refining, included under both "All Manufacturing" and "Petroleum Industry," is included only once in the total

1. American industry is demonstrating that it does not need the stimulus of war-created shortages, or a rearmament boom, in order to maintain a very high level of capital investment.

The slight decrease now planned for 1955 will still maintain a level only about 11 percent below the all-time peak attained in 1953 under the stimulus of a defense expansion boom.

2. Capital investment promises not merely to stabilize at a high level, but actually to increase as 1955 goes on and thus give renewed stimulus to business.

The level of investment now planned for 1955 by *industry*—manufacturing, petroleum, mining, transportation, communications and utilities—is within 5 per cent of 1954. Contract awards for *commercial* construction—stores, office buildings, warehouses and other service establishments—as compiled by the McGraw-Hill publication *ENGINEERING NEWS-RECORD*, indicate a substantial increase in 1955. Thus total capital expenditures by *all business* may be very close to this year's total.

Actually, in the fourth quarter of 1954, business capital expenditures, as reported to the U. S. Department of Commerce, are down about 2.5 per cent from the average for the year as a whole. So there is a good chance that during 1955 the annual rate of capital investment will rise above this present level.

Effect of Tax Changes

The plans reported by the McGraw-Hill survey are preliminary plans, reported at the beginning of the period of business budgeting for 1955. As budgets are completed, new projects may bring the total expenditure that is planned even closer to this year's figure and thus make an even greater contribution to continuing prosperity.

But it also cannot be too strongly emphasized

that these are plans; they are not accomplished investments. As such they have the vulnerability to changed conditions that characterize any plans.

There is some indication in the results of the McGraw-Hill check-up that one change in conditions recently made by the United States government has had an important stimulating effect on plans for business investment next year. It is a liberalization of the allowances for depreciation. Apparently encouraged by this provision, most of the smaller companies are planning to maintain or increase their purchases of new equipment next year, whereas during the past three years their expenditures have been declining. This is obviously a development that strengthens our economy.

A government insensitive to the key importance of capital investment by business, both in providing prosperity and in raising our standard of living, might easily destroy the present plans. One of the easiest and surest means to do this is excessive taxation of business profits which are the key ingredient of business investment. Whether the extraordinarily constructive program recently enacted by the federal government in the field of business taxation can be sustained remains to be seen. **If it can be sustained, the remarkably cheering plans of business for capital investment in 1955 can readily become firm foundations for a continuing prosperity.**

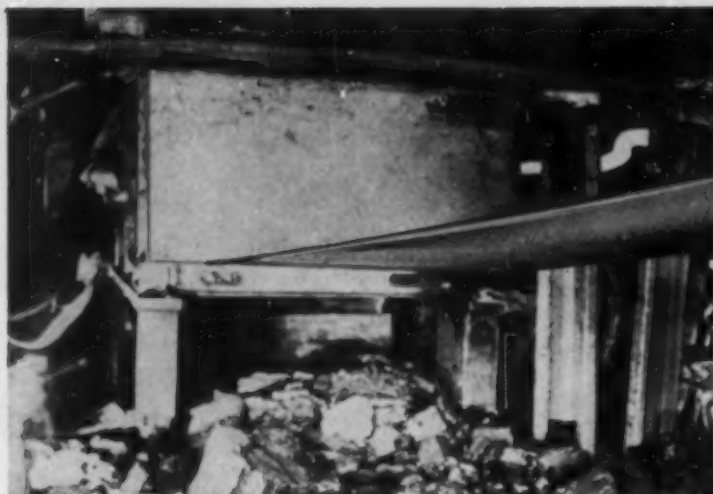
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Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.



*Note extremely rugged conditions in this photo, showing bottom loading conveyor system in British coal mine. Inset shows roll of SCANDURA.

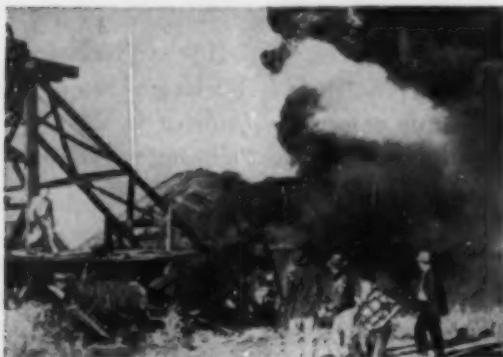
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conveyor belting that eliminates one of the great hazards of mining—fire caused by friction when your conveyor belt slips or stalls.



LET'S LOOK AT THE RECORD!

About 12% of coal mining fires in the past several years have been attributed to conveyor-belt friction.

At the 1953 annual meeting of the Illinois Mining Institute, data was presented to show that the majority of belt fires result from stalled belts while the driving pulley continues pulling.

In the tragic Evanston, Ky. fire in which 4 men lost their lives, fire was reported to have had its origin in the friction caused when a fall stopped the belt, while the drive motor continued to operate.

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NEWS ROUND-UP

News Briefs and Trends

Southern Group Weighs Cuts in Labor Costs

Southern Coal Producers' Association has authorized its president, Joseph E. Moody, and its executive committee to end its contract with the UMWA if developments warrant such a course. But Mr. Moody, following the association's action Nov. 9, was quick to say that such action was "not an imminent prospect." Instead, he expressed the belief that labor costs could be cut by negotiating changes in "practices under the present contract and clarifying provisions of the contract without rewriting it."

The association's action followed introduction of a resolution, which was not adopted, that would have directed Mr. Moody to seek new negotiations with the UMWA. He reported that discussion of the resolution was "pretty belligerent."

Glen Alden to "Tool Down" Production Capacity

Glen Alden Coal Co., Wilkes-Barre, Pa., the Nation's largest producer of anthracite, will "tool down" to a capacity of 3,500,000 tons annually by spring of 1955. The company's present capacity is from 5,000,000 to 6,000,000 tons. F. O. Case, Glen Alden president, who made the cut-back announcement, said he believed the anthracite industry's production would level out between 15,000,000 and 17,000,000 tons in the next year or two and that his company's curtailment was an attempt to adjust to future conditions.

Turning to current operations, Mr. Case pointed out that Glen Alden increased its share of industry tonnage to 24% in the first 9 mo of 1954, compared with 20% in the same period last year, and that a profit of \$523,000 thus far this year, before depreciation and depletion, was a substantial improvement over a loss of \$764,000 in the same period last year. Depreciation and depletion set-asides, however, produced a net loss of \$1,240,000 thus far in 1954. Net loss in the first three quarters of 1953 was \$2,565,000.

Mr. Case explained that lower direct costs resulting from curtailed production probably would offset higher overhead costs and that the cutback would strengthen the company's direct operating control. He also announced that the company has reduced its wholesale organization from 13 to 4 regional offices and sold five retail outlets in Canada, New York, New Jersey and New

England. He said the company will have sold most of its retail outlets by the end of the year, with provision, however, for the continued purchase of Glen Alden coals on a long-term basis. Sales to industrial users now account for about 20% of the company's total output, he pointed out.

Experiment With New Way To Gasify Coal Underground

First steps were taken at the end of October in trying out a new method of gasifying coal without mining it. The new method, capping an 8-yr series of efforts involving the Alabama Power Co. and the U. S. Bureau of Mines, depends upon hydraulic fracturing as a means of opening air passages through a coal seam. These passages, it is believed, will speed coal burning and thus produce more gas than has resulted from earlier methods.

The new test, in which Alabama Power Co. and the USBM are being joined by Stanolind Oil & Gas Co. and Halliburton Oil Well Cementing Co., calls for pumping a mixture of waste oil, napalm and sand through a drillhole lined with steel

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and cement. Pumping pressures run as high as 12,000 psi. Theoretically, the coal seam cracks under this pressure and the liquid mixture penetrates the coal. Kerosene then is pumped in to thin the mixture. When the mixture is withdrawn, the sand remains behind to prop open the fractures.

Ignition of the seam, located on property of the Alabama Power Co. at Gorgas, Ala., will not take place until fracturing results have been studied.

Jamison No. 9 Explosion Claims 16 Victims

Fifteen men were trapped underground and are believed dead and one man was killed on the surface as the result of a mine explosion Nov. 13 at Jamison No. 9 mine, Farmington, W. Va., a property recently acquired by



Anthracade Promotes Better Home Heat

A MOBILE DISPLAY containing all types of automatic anthracite heating equipment, under fire and in motion, together with educational materials, now is touring county fairs in the anthracite market area. After a preview at the recent convention of the Fuel Merchants' Association at Atlantic City, the big trailer made its first public appearance at the Bergen County Industrial Exposition Nov. 3-9, at Teaneck, N. J. Accompanied by the Coalmobile, the Anthracade will make the circuit of indoor shows during the winter. Shown inspecting the trailer above is Miss Maureen Marinos, 1954 Anthracite Queen.

Pittsburgh Consolidation Coal Co. in its purchase of the Jamison Coal & Coke Co. The explosion, of undetermined origin, ripped through the mine at approximately 1:45 pm with a Saturday maintenance crew underground. Two other men, working underground near the portal, were able to make their way to the surface. Later explosions, Saturday evening and early Sunday morning, led to a decision among state, federal, union and company officials to abandon further rescue efforts and to seal the mine openings. According to reports, the main portal and ventilating fan were demolished by the initial blast. No immediate explanation for the explosion was available, and determination of the causes was to await extinguishing of the fire raging within the mine. Modernization of the property had recently been completed at a cost of several million dollars, and state, federal and company officials were at a loss to account for the disaster.

Dixon-Yates Power Plant Gets Congressional Approval

The Atomic Energy Commission's contract with the Dixon-Yates group for construction of a 600,000-kw steam power-generating plant received the required approval from the Joint Congressional Atomic Energy Committee Nov. 13. The go-ahead, which was a 10 to 8 vote on a strict party basis, climaxed a bitter and intense political battle that had raged ever since President Eisenhower's order for the utilization of privately generated power by the AEC was revealed last June. Construction of the plant by private interests at an estimated cost of \$107,250,000 will eliminate the necessity of using such an amount of federal funds for capital investment, the administration has pointed out. The plant will be built at West Memphis, Ark., and is being planned to supply the TVA with power to replace that being used by the AEC. Opponents of the project, who have vowed to continue their fight in the next Congress, oppose it as a reversal of the federal power policy and because of the lack of competitive bidding, among other reasons. Following the committee action, the Dixon-Yates group Nov. 17 applied to the SEC for approval of its plans for financing construction of the plant.

1955 Steel Output to Rise 6 to 12%, Fairless Predicts

The American steel industry next year will, at conservative estimate, surpass by 5 to 10 million tons its 1954 production, which will amount to approximately 86 million tons, Benjamin F. Fairless, chairman of the board of United States Steel Corp., forecast Nov. 17 in a talk to the annual meeting of the Alabama State Chamber of Commerce, in Birmingham, Ala. As for the American economy generally, Mr. Fairless said that "my personal opinion is that the year 1955 should be one of moderate gains all along the line; and that business as a whole will gather its strength and regroup its forces for a still more rapid expansion in the latter part of the 1950s." The ex-

pected rise of 5 to 10 million tons in steel production next year, more than 6 to almost 12%, should take place even if consumers of steel do not build up their inventories, which have been cut in some cases, Mr. Fairless believes, "beyond the point of prudence." In addition, any such step-up in the output of steel would, in itself, tend to generate a further demand for steel, Mr. Fairless pointed out.

Republic Steel Acquires Ford Collieries Mines

Purchase of the coal properties of the Ford Collieries Co. by the Republic Steel Corp. was announced in Cleveland, Nov. 17. The inactive Ford property, consisting of the Francis and Berry mines, adjoins Republic's Russelton (Pa.) mine on the northwest and will strengthen the steel corporation's reserves of coal in the Allegheny valley. Plans call for expansion of the Russelton mine into the new property as quickly as possible. Coal will be brought to the surface through the Russelton opening and processed in the Russelton cleaning plant.

1954 Coal Output to Date

Bituminous production for the year totaled 331,537,000 tons through Nov. 13, a drop of 16.7% as compared with the same period of 1953, according to USBM figures released Nov. 19. Output for the week ending Nov. 13 was 8,720,000 tons, compared with 8,510,000 tons for the previous week and 8,829,000 tons for the week ending Nov. 14, 1953. Anthracite output through Nov. 13, 1954, was estimated at 22,947,000 tons, a decrease of 15.9% from last year. Production for the week ending Nov. 13 was 624,000 tons, against 521,000 tons the previous week and 615,000 tons in the same week of 1953.

"Largest" Turbine for Utility

"The largest steam turbine-generator in the world" has been ordered by the Detroit Edison Co. from the Allis-Chalmers Mfg. Co. for installation late in 1957 at its River Rouge (Mich.) plant now under construction. The new unit, the third to go into the plant, will have a capacity of 300,000 kw, sufficient for the electrical requirements of an industrial city of 1/2 million people. The first two units, with a capacity of 260,000 kw each, are scheduled to be in operation in 1956. The new 300,000-kw generator will be one of the most economical ever built, producing 1 kw-hr for less than 1/4 lb of coal, Detroit Edison reports.

Court Rules Operator Not Liable for Culm Bank Gasses

In a decision that may have an effect on the entire industry, the Pennsylvania State Supreme Court ruled Nov. 8 that an anthracite operator is not necessarily responsible for the gases given off by a burning culm bank. By a 5 to 2 vote, the court reversed the State Superior Court's overruling of the Lackawanna County Court, which had held against a couple who were seeking \$1,500 from the Moffat Coal Co. for repainting of their house

discolored by the gases. In the majority opinion, the Supreme Court said that the "defendants did not know and had no reason to anticipate the emission of this gas and the results that might follow."

Second Panther Valley Mine Set for Re-Opening

Lehigh Coal & Navigation Co. early in November granted a lease that probably will re-open a second mine from the properties of Lehigh Navigation Coal Co., which now is in process of liquidation. The first re-opened mine, in the Lansford district, began production Oct. 4 under direction of W. Julian Parton, former LNC official and president of the newly organized Panther Valley Coal Co. The new lease, which covers property in the Coaldale district, has been taken by the newly organized Coaldale Mining Co., Inc., headed by James H. Pierce, chairman of Pierce Management, Inc. Scranton. John Marshall, president of Pierce Management, and F. L. Rousselle, executive vice president and treasurer, are executive vice president and vice president-treasurer, respectively, of the new company. An agreement under which the company plans to re-open the property reportedly was ratified by the Coaldale UMW local Nov. 13 and resumption of operations has been tentatively set for Dec. 6.

W. Ky. Stripping Changes Hands

Control of Paradise Collieries, Inc., Paradise, Ky., passed Nov. 4 to Investment Associates, Inc., following sale of 51% of the stock held by West Virginia Coal & Coke Corp. Pice involved in the exchange was not stated but Morris Creditor, West Virginia Coal & Coke president, said that it reflected approximately his company's investment in the property. Investment Associates, Inc., the new owner, has employed Pittsburg & Midway Coal Mining Co. to operate the mine and has made a contract for coal sales with Pittsburg & Midway Coal Co., Chicago. No change in personnel or operations is planned for the present, Mr. Creditor said.

Weyanoke to Re-Open Mine

Weyanoke Coal & Coke Co. will resume production at its mine at Arista, Mercer County, W. Va., about the first of the year. Renovation of the mine already was under way late in October, with equipment being installed to mechanize the mine completely. At the time of its closing last July, the Arista mine was a handloading operation with 112 workers and daily capacity of 600 tons. Earlier, before a cutback last February, the mine had employed 215 men and had a capacity of 1,100 tpd.

CMIA Sets December Meeting

Joseph E. Moody, president, Southern Coal Producers' Association, will be the principal speaker at the Thursday night banquet of the Coal Mining Institute of America, which has scheduled its 68th annual meeting for Dec. 9-10 at Pittsburgh, Pa. All sessions will be held at the Hotel William Penn. Besides Mr.



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Moody's address, the program for the 2-day meeting includes discussion of underground gas storage, continuous mining with extensible belt conveyors and other equipment, the coal planer, roof control and safety.

British Seek To Raise Deep and Strip Output

The largest coal-stripping contract ever awarded by the open-cast division, British National Coal Board, was signed Oct. 28 with Wilson Lovett & Sons, Ltd. The company has been stripping in the Midlands and South Wales areas since open-pit mining was begun during World War II. The contract calls for production of about 4,000,000 long tons of coal over the next 10 yr from a hillside site at Tirpentwys, near Pontypool, in Monmouthshire. Overburden, ranging up to 150 ft in depth, will be removed by two 1150-B Bucyrus walking draglines with 20- and 25-yard dippers. Coal will be trucked out of the pit and carried by belts to crushers and screens. This is the first of several large contracts NCB expects to award in the next 6 mo.

Earlier, at the end of September, NCB launched underground and surface construction costing over \$18,000,000 in an effort to raise annual output from 900,000 to 1,250,000 tons by 1960 at the new Monckton Collieries. A new shaft and a new cleaning plant will be built and diesel locomotives, new mine cars and belts will be put into service.

Enoco Wins Indiana Meet

At the Indiana Third Annual Safety and First Aid Meet held recently at Princeton, Ind., top honors were awarded the second-shift team representing Enoco Collieries Corp. No. 5 mine. Second place went to the King's mine team, Princeton Mining Co.; third, Sunshine mine, Wolfe & Koenig Corp.; fourth, first-shift team, No. 5 mine, Enoco Collieries Corp.; and fifth, Green Valley mine, Snow Hill Corp. The meet was sponsored by the Indiana Joint Committee for Coal Mine Safety.

Assembly Line Turns Out 1,000th Self-Firing Stoker

The board of directors and the two advisory board of Automatic Solid Fuels Equipment, Inc., together with representatives of the press, were scheduled to meet Dec. 7 at New Albany, Ind., to watch the 1,000th Campbell stoker roll off the assembly line. The Campbell Automatic Coal Burner is a bin-feed unit equipped with an electrical firing device that ignites the fuel bed when signaled by the thermostat. The corporation is sponsored by coal retailers, shippers and producers. The 1,000-unit mark was reached after a scant 10 mo of assembly-line production at the New Albany plant. Throughout the preliminary planning stages and since the plant went into production, Automatic Solid Fuels Equipment, Inc., has been guided by a board of directors representing a cross-section of the bituminous industry, plus advisory boards on engineering and retailing.

More Briefs on p 132

Illinois Report . . . Begins on p 94

tries that were to become intakes were cleaned up, including taking down top coal and shale. Support then was provided by treated planks held in place by two bolts each. Both slope compartments and the future intake entries were treated with a waterproof roof-coating material, including 8 in along the top of each rib. This coating was carried 7,000 ft in all openings. The roof in this area suffered little, but in the next 12,000 ft of untreated entry, the effect of the hot, humid air was "devastating." Beyond, the air had become so conditioned that it had little effect. Though trouble was experienced, it was minimized by immediate application of the roof-sealing compound.

Other measures necessitated by the change included the following: protected locations for men boarding mantrips or working on the bottom; adequate means of allaying dust in the haulageway to prevent it from being carried back into the workings; rigid inspection of seals, particularly for several months immediately after the reversal; and development of a plan of action and education of personnel in what to do in case of fire. Face ventilation offered no particular problems, even though the mine is classified as gassy. Methan production increased only slightly, and at the last inspection was reported as 0.23%.

STRIP DRILLING

As a result of rising costs and increasing overburden ratios, the Maumee Collieries Co. has been forced to devote greater attention to drills and drilling practices, said Lafe Stewart, chief engineer, in discussing the performance of the new Bucyrus-Erie 50-R drill. By 1952, Maumee had adopted a drilling and blasting system based on the use of eight 42-T churn drills with 10-in bits. Annual requirements were 15,000 holes totaling 700,000 ft, 6 to 8 million pounds of explosives and 60 million gallons of water.

Average rate of drilling 10-in holes was 17 ft per hr, with a 50-man labor force. Reduction of costs seemed to lie largely in increased drilling speed. Rotary drills using compressed air for removing cuttings had proved themselves, but hole sizes were less than 10 in. Since Maumee needed 10- to 12-in holes, Bucyrus-Erie was interested in developing a roller-cone compressed-air machine capable of drilling such holes.

Designated the 50-R, the first was delivered to Mine No. 27 in September, 1952 (*Coal Age*, March, 1953, p 80). Three machines are now in operation, and sufficient experience has been gained to establish production rates. Among other things, one 50-R drill operating two shifts six days a week can do the same work as four 42-Ts operating three shifts. In drilling 817,000 ft of 10-in hole, the 50-R has averaged 100.22 ft per hr, against 17 for the 42-Ts, and "our apparent saving in the combined item of labor and drill supplies has been approximately 25¢ per foot."

There are, however, Mr. Stewart noted, some limiting factors. The 50-R costs four times the conventional churn drill, and consequently is for the larger operation with lots of work. It may be too heavy for rough or soft ground, and the hazard of serious production delays is increased by putting more responsibility on a single unit. Advantages, where conditions permit use, include:

1. Higher drilling speed, permitting one big unit to replace as high as six conventional units, reducing labor to a minimum.
2. Clean, smooth-bore holes with stemming ready at the mouth, increasing shot-loading efficiency as well as the efficiency of the blast itself.
3. No water, eliminating expense and inconvenience.
4. High speed and ability to produce a high footage of large-diameter hole economically, making possible the economical use of bulky, slow-speed explosives.

CLAYS AND COAL MINING

Because of their presence and their reaction to outside influences, notably moisture, clays can have a substantial effect on mining operations, said W. Arthur White, associate geologist, Ill. Geological Survey. Explaining the types of clays and how they are formed, Mr. White detailed how they change character through the absorption of water—swelling and becoming more plastic. Different types react to different degrees—in general, as follows:

Kaolinite well-crystallized illite in roof shales tend to result in stable conditions and good roofs.

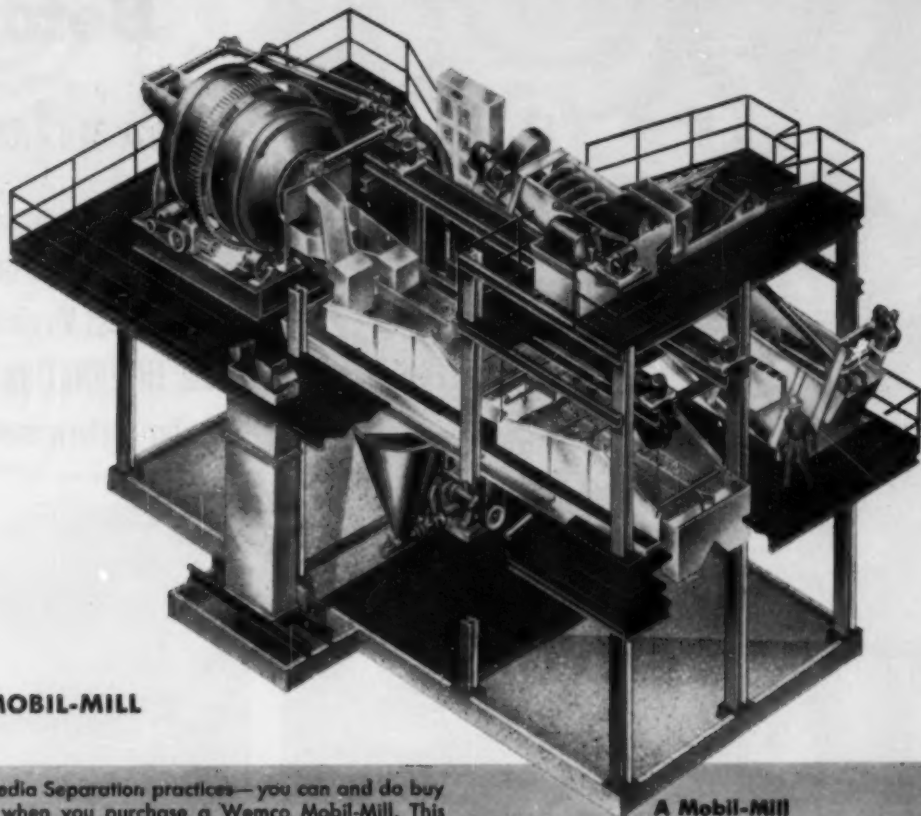
Montmorillonite and hybrids of montmorillonite and illite or chlorite tend to absorb water and swell, resulting in unstable roofs and squeezing of bottom.

COAL MARKETS

Noting that the dominant factor in the latest downswing in coal production was the drop in railroad consumption as a result of dieselization, Dr. Walter H. Voskuil, mineral economist, Ill. Geological Survey, and professor of mineral economics, University of Illinois, presented a roundup of favorable factors in other markets, both nationally and for Illinois in particular.

His findings included a sharp upswing in public-utility consumption in Illinois as well as nationally; a favorable situation in general manufacturing, in part a result of favorable coal cost; good prospects in iron and steel production; and a slowing up in the rate of domestic decline. Oil should not be so heavily competitive from now on. Natural gas, however, is still tough, and coal still cannot sell against the interruptible type in industry. Atomic power offers no threat in the foreseeable future. Finally, population growth is expected to continue, and if the standard of living continues to rise, as it should, the use of fuel and power will continue to rise.

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for big West Virginia operator
finds INTERNATIONAL TD-24s
tops for performance, durability.



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POWERFUL BUT POISED, the TD-24s work the rocky overburden off the seam into the worked-out section of the 200-acre lease.



L. E. Cleghorn is one of the biggest strip mine operators in West Virginia, and at his mine near Clarksburg he gets up to 15,000 hours hard work from INTERNATIONAL TD-24s removing 70 foot of overburden from an 8-foot seam.

David Wiltse, in charge of laying bare this coal seam, tells how he gets the job done:

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life makes them 'Champs of the Strip'!"

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Personal Notes

Joseph A. Martin, vice president and comptroller since 1948, has been elected president of the Pennsylvania Coal Co., Scranton, Pa., succeeding Ralph A. Lambert, who resigned because of ill health. A graduate of the Wharton Extension School of the University of Pennsylvania and the University of Scranton, Mr. Martin first joined the company in 1918 as a supply clerk at its No. 9 colliery and had been chief bookkeeper and auditor before becoming vice president and comptroller. Mr. Lambert, who had been on leave of absence since August, joined the company in 1940. He became general manager in 1943, vice president and general manager in 1946 and had served as president since August, 1953.

Guy N. Haynes has been named preparation manager, Pocahontas Fuel Co., Pocahontas, Va., according to an announcement Nov. 13 by A. V. Sproles, vice president in charge of operations. Mr. Haynes, who has been superintendent of the company's Itmann preparation plant since January, 1952, succeeds J. W. Forman, who resigned to accept a position as service and preparation engineer with the Fairmont Machinery Co., Fairmont, W. Va. A graduate of VPI, Mr. Forman joined Pocahontas Fuel as preparation engineer in September, 1949. Mr. Haynes joined the company in 1935 in the construction department, later becoming foreman of one of the construction crews. Before becoming superintendent of the Itmann plant, Mr. Haynes had been tippie foreman at Itmann for 2 yr.

Henry Strubeck, former safety official for Lillybrook Coal Co., has rejoined the U. S. Bureau of Mines as safety repre-

sentative in the Morgantown, W. Va., office. In his new post, Mr. Strubeck will teach first aid.

R. R. (Bob) Williams Jr. has been named manager of mines, Colorado Fuel & Iron Corp., Pueblo, Colo. He had been made assistant manager of mines late in 1953 after being with C. F. & I. since 1925. In his new position, he succeeds George H. Rupp, deceased.

Walter L. Beene, formerly safety inspector, Lillybrook Coal Co., has been made section foreman, Garden Ground mine, The New River Co., Mt. Hope, W. Va.

Norman C. Michels has been appointed to the newly established position of assistant vice president in charge of engineering, Tennessee Coal & Iron Div., U. S. Steel Corp. His appointment became effective Dec. 1. For the past 3 yr, Mr. Michels was chief engineer—project development, Engineering Div. of U. S. Steel Corp.

Charles Johnson, section foreman, Kopperston No. 1 mine, Eastern Gas & Fuel Associates, Kopperston, W. Va., has been promoted to assistant general foreman in charge of the midnight shift.

James D. Francis, president, Powellton Coal Co., Huntington, W. Va., was recently awarded an honorary Doctor of Laws degree, one of three honorary awards presented to outstanding leaders of the area by Davis and Elkins College, Elkins, W. Va., during the inauguration ceremonies of the new college president. Mr. Francis also holds honorary Doctor of Laws degrees from West Virginia University and Marshall College.



Stanbury Joins Factory M&M

W. A. STANBURY, JR., associate editor of *Coal Age*, last month joined the staff of *Factory Management and Maintenance*, another McGraw-Hill publication, as associate editor with responsibilities as an assistant managing editor. Mr. Stanbury, who joined *Coal Age* as an assistant editor in 1946, following more than 3½ yr of active duty in the Naval Reserve, is widely known throughout the coal industry for his *Coal Age* articles in the fields of economics, merchandising, safety and labor relations. During his service with *Coal Age*, he traveled extensively throughout the United States, attending meetings and gathering background material, and is the author of feature articles on many major industry problems. A graduate of Duke University, Mr. Stanbury held the rank of lieutenant commander on his release from the Navy. Previously, he had been in college work and public relations writing in the Carolinas.

USBM Names Personnel, Reorganizes Health, Safety and Inspection Service

Health, safety and coal-mine inspection functions will be separated from other programs of the U. S. Bureau of Mines in a reorganization scheduled to take effect about Jan. 1, 1955, according to a recent announcement by Douglas McKay, Secretary of the Interior.

The changes include creation of a Division of Health and a Division of Safety, with headquarters in Washington, and the establishment of 8 district and 12 subdistrict offices. District and subdistrict offices will be independent of the Bureau's regional organization, for which realignment plans were announced early in October (*Coal Age*, November, 1954, p 132).

The new Division of Safety will be headed by William J. Fene, who now is assistant chief, Health & Safety Div. The Coal Mine Inspection Div. will be under direction of Harry F. Weaver, as announced earlier. A chief has not yet been selected for the new health division.

The health division will include a health-research branch at Pittsburgh, Pa., to be under direction of L. B. Berger. The Division of Safety will have two branches, one at Washington, D. C., under direction of Seth T. Reese, for analysis of accidents; the other at Pittsburgh, headed by E. J. Gleim, for electrical-mechanical testing.

Harold J. Sloman, now assistant to the director, USBM, will be coordinator of educational activities; W. H. Tomlinson, now chief of accident prevention and health in Region VIII, will be field coordinator of safety education, with offices at Pittsburgh; and William Rachunis will coordinate Holmes Safety Association work, with headquarters at Beckley, W. Va.

Secretary McKay also named the eight district supervisors of health and safety, as follows:

E. H. McCleary, District A, Wilkes-

Barre, Pa.; subdistrict office, Albany, N. Y.

W. Dan Walker, District B, Pittsburgh; subdistrict offices, Johnstown, Pa., and St. Clairsville, Ohio.

W. R. Park, District C, Mt. Hope, W. Va.; subdistrict offices, Morgantown, W. Va.; Norton, Va.; and Barboursville, Ky.

M. C. McCall, District D, Birmingham, Ala.; subdistrict office, Jellico, Tenn.

E. E. Quenon, District E, Vincennes, Ind.

J. A. Johnson, District F, Duluth, Minn.

G. M. Kintz, District G, Dallas, Tex.; subdistrict office, McAlester, Okla.

J. Howard Bird, District H, Denver, Colo.; subdistrict offices, Anchorage, Alaska; Seattle, Wash.; Salt Lake City, Utah; Phoenix, Ariz.; and San Francisco, Calif.



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Pittsburgh Coal Mining Institute Attracts Over 500 at 26th Annual Banquet

"COAL IS NOT THROUGH . . . it is not obsolescent" declared Pennsylvania Gov. John S. Fine, principal speaker at the 26th annual banquet of the Pittsburgh Coal Mining Institute, held at the William Penn Hotel, Pittsburgh, Nov. 6. The annual function was attended by over 500 members, wives and guests. George H. Deike, chairman of the board, Mine Safety Appliances Co., Pittsburgh, was chairman of the banquet committee, and Karl L. Konnert, Pittsburgh, was toastmaster.

To strengthen the coal industry, Gov. Fine said, the National Governors' Fuel Conference is now sponsoring a program which includes the following goals:

1. Reduction of residual oil imports. Imported oil displaced 57 million tons of

coal in the United States in 1953, resulting in an economic loss of \$163 million. Loss in wages in the coal industry alone were \$81 million.

2. Development of a sound policy regarding export of United States coal to European and Asian markets.

3. Limitations on Canadian natural gas imports.

4. Establishment of a federal fuels policy which would stress the use of coal in government installations.

Gov. Fine said that the Governors' Fuel Conference is the strongest force possible placed at the disposal of the coal industry. However, the success of the program depends upon the industry, including the management and labor.

AIME Honors Deike and Oliver

The Board of Directors of the American Institute of Mining and Metallurgical Engineers Nov. 18 announced the award of the Erskine Ramsay Gold Medal to George Herman Deike, chairman of the board of Mine Safety Appliances Co., Pittsburgh; and the James Douglas Gold Medal to Edwin Letts Oliver, president of Oliver United Filters, Inc., and an institute director, of San Francisco. Formal presentation of the medals, which were among 11 awarded in recognition of achievement in the mineral industries, will be made at the AIME annual meeting in Chicago, Feb. 14-17.

Mr. Oliver was awarded the James Douglas Gold Medal, according to his citation, "for his invention of the Oliver continuous filter—a most outstanding contribution to non-ferrous metallurgy and widely applicable to industrial fields throughout the world. A man of far flung interests, a distinguished engineer and administrator, beloved and respected for assistance given younger engineers."

Mr. Deike's citation for the Erskine

Ramsay Gold Medal reads as follows:

"As an engineer, manufacturer and executive, Mr. Deike has served the mining industry with distinction in many ways, particularly in the field of mine safety. His pioneering work in the application of engineering principles in reducing the dangers inherent to mining has earned for him an international reputation.

"Under his direction as an administrator, inventor, and manufacturer of safety appliances, his company has become pre-eminent in the manufacture of industrial safety equipment.

"He has been a leader in the applica-

MEETINGS

National Mine Rescue Association:
Annual Meeting, Dec. 8, Hotel William Penn, Pittsburgh, Pa.

Coal Mining Institute of America:
68th Annual Meeting, Dec. 9-10, Hotel William Penn, Pittsburgh, Pa.

tion of scientific research in the promotion of safety and efficiency in industry. His company has recently dedicated the world's largest research center devoted exclusively to the development of safety equipment. This laboratory, one of the most modern of its kind, symbolizes his basic philosophy—"Keep ahead of safety needs in the mining industry."

"Mr. Deike, with all his business responsibilities, has always taken a very active part in civic and community activities, and his genial personality and his humane qualities have endeared him to his host of friends everywhere."

Companies Report Earnings

Lehigh Valley Coal Corp.—9 mo to Sept. 30, 1954, net loss of \$1,079,496 on gross sales of \$12,048,650, against net loss of \$1,519,815 on gross sales of \$14,354,106 in the same period, 1953.

Philadelphia & Reading Coal & Iron Co.—9 mo to Sept. 30, 1954, net loss of \$1,667,401, including profit of \$774,000 from sale of a culm bank, against net loss of \$186,257 in the same period, 1953.

The Hudson Coal Co. and subsidiaries.—9 mo to Sept. 30, 1954, net loss of \$2,709,668, against net loss of \$2,220,725 in the same period, 1953.

Lehigh Coal & Navigation Co.—9 mo to Sept. 30, 1954, net loss of \$1,887,951, against net income of \$289,823, including tax credit of \$322,497, in the same period, 1953.

Ayrshire Collieries Corp.—Quarter to Sept. 30, 1954, net income of \$176,131, or 31c per common share, against \$81,473, or 14c per share, in the same quarter, 1953.

Island Creek Coal Co.—9 mo to Sept. 30, 1954, net income of \$833,901, equal to 61c per common share, against \$1,025,899 and 77c in the same period, 1953.

Pond Creek Pocahontas Coal Co.—9 mo to Sept. 30, 1954, net income of \$614,700, equal to \$1.81 per common share, against \$995,679 and \$2.93 in the same period, 1953.

West Kentucky Coal Co.—9 mo to Sept. 30, 1954, net income of \$446,487, or 54c per common share, against \$1,280,611 and \$1.49 in the same period, 1953.

Bell & Zoller Acquires Coal Sales Agency

Bell & Zoller Coal Co. has acquired Holly Stover, Inc., shippers of low-volatile coals from southern West Virginia, and will handle the sale of coals formerly marketed by that agency. The entire sales staff of Holly Stover, Inc., will be absorbed by Bell & Zoller and offices will be maintained, as before, at Mt. Hope, W. Va., Washington, D. C., and Chicago, Ill.

Lehigh University Host To NCA Training Group

Admission of students to mining-engineering schools, counseling techniques, co-operation between the coal industry and colleges and universities, and revision of text and reference books were



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top subjects at the meeting of National Coal Association's Committee on Vocational Training and Education held Oct. 22-23 at Lehigh University, Bethlehem, Pa.

Committee members reviewed the mining-engineering courses and related subjects offered in the Lehigh curriculum, sought ways to recruit young engineers for coal mining and appealed for placement of engineering students in summer jobs with coal companies.

Attending the meeting were: H. C. Woods, Sahara Coal Co., committee chairman; L. I. Cothorn, Jewell Ridge Coal Corp.; R. C. Luther, Peerless Coal & Coke Co.; Davis Read, consulting engineer; J. D. Reilly, Hanna Coal Co.; H. C. Walter, Lorain Coal & Dock Co.; F. R. Zachar, Christopher Coal Co.; Dr. M. Edmund Speare, National Coal Association; and M. D. Cooper, NCA's director of mining-engineering education.

Lehigh officials and faculty members taking part in the 2-day session were: President M. D. Whitaker; Dr. W. H. Congdon, dean of students; Dr. S. H. Missimer, admissions office; Dr. L. V. Bewley, dean of engineering; Dr. R. T. Gallagher, head of mining engineering; Dr. W. J. Eney, head of civil engineering; Dr. Bradford Willard, head of geology; Dr. Glenn Christensen, chairman, General Studies Div.; and Dr. A. W. Brune, mining engineering department.

Federal Aid Proposed to Stop Anthracite Flooding

Secretary of the Interior Douglas McKay and Secretary of Commerce Sinclair Weeks have obtained President Eisenhower's approval for a proposed \$8,500,000 federal aid program to prevent surface water from flooding anthracite mines.

The proposed project would strengthen the economic future of the anthracite industry and provide more than 2,000 jobs in surface-drainage work and the manufacture and installation of pumps and other equipment.

The two executive department chiefs will make their recommendation to Congress in the near future. Their proposal will include the proviso that the Commonwealth of Pennsylvania appropriate at least an equal sum and assume responsibility for operating and maintaining the project. Meanwhile, with Pennsylvania's current drainage funds exhausted, federal officials will attempt to make \$1,500,000 available immediately to continue present projects. Any such advance would be deducted later from funds that might be appropriated by Congress.

The proposed federal program resulted from a request by the President that the work of federal agencies be coordinated in seeking ways to improve employment in surplus-labor areas. A task force from the Northeast Pennsylvania Industrial Development Commission urged the President to throw his weight behind the mine-water problem and to provide federal participation in a drainage project outlined by the Pennsylvania Anthracite Mine Drainage Study Commission.

Obituaries

Ezra Van Horn, 72, for many years chief negotiator for the northern and western coal producers, died Oct. 28 at Cleveland, Ohio. At the time of his death, Mr. Van Horn was executive vice president, Ohio Coal Association. He had served as chairman of the Joint Wage Conference of operators and the UMWA from 1939 to 1949. He was the first operator trustee of the UMWA welfare fund, a position from which he resigned in 1949. Born in Logan County, Ohio, Mr. Van Horn came to Cleveland in 1921 as vice president and general manager, Clarkson Coal Mining Co., and president, Clarkson Coal & Dock Co. He remained with the latter company until 1933, when he was named to the position he held at the time of his death.

Phillip Dillon, 66, formerly mine foreman, Marianna mine, Bethlehem Mines Corp., Marianna, Pa., died in Mercy Hospital, Pittsburgh, Oct. 26, following a 6-mo illness. Mr. Dillon, who retired at Marianna in March after 30 yr service, was a noted athlete as a young man, having been a three-letter man at the University of Pittsburgh and a football teammate of the late Jock Sutherland.

George Herbert Rupp, manager, Mining Dept., Colorado Fuel & Iron Corp., died Oct. 11 at Pueblo, Colo. Joining C. F. & I. in 1929 and moving up into the position he held at the time of his death, Mr. Rupp was responsible for exploration for coal, limestone, iron ore and other minerals. Recently, he directed the development and opening of the company's new Allen mine in southern Colorado.

Association Activities

Kentucky River Group Meets

At a recent meeting of the Kentucky River Mining Institute, held in Lexington, Ky., S. A. Fox, general manager, northern mines, Blue Diamond Coal Co., Middlesboro, Ky., was elected president of the institute, succeeding G. O. Tarleton, president, Consolidation Coal Co. (Ky.), Jenkins, Ky. Other officers elected were: H. E. Knight, Madisonville, Ky., first vice president; F. F. Stewart, Hazard, Ky., second vice president; E. F. Milen, Stone, Ky., third vice president; and A. D. Sisk, Lexington, Ky., secretary-treasurer.

Harlan Coal Operators Elect

F. L. Dupree, president, Clover Darby Coal Co., Harlan, Ky., was elected president of the Harlan County Coal Operators' Association at its annual meeting Nov. 5. S. A. Fox, general manager, northern mines, Blue Diamond Coal Co., Middlesboro, Ky., was elected vice president. Members of the executive board named were: Pearl Bassham, president, Harlan Wallins Coal Corp., Harlan; Kenes Bowling, president, Bardo Coal Mining Co., Bardo; John A. Brown, general manager, V&C Coal Corp., Grays

Knob; S. J. Dickenson, secretary-treasurer, Mary Helen Coal Corp., Coalgood; J. S. Greene, president, Carmeada Coal Co., Middlesboro; Charles S. Guthrie, manager, Harlan Fuel Co., Yancey; L. P. Johnson, president, Crummies Creek Coal Co., Crummies; D. A. Perkins, president, Perkins-Harlan Coal Co., Liggett; R. C. Scott, president, Cornett-Lewis Coal Co., Louellen; Ed Taylor, manager, High Splint Coal Co., High Splint; A. F. Whitfield Jr., president, Clover Fork Coal Co., Kitts; and B. W. Whitfield III, manager, Harlan Collieries Co., Brookside. George S. Ward is secretary of the association.

Preparation Facilities

Compass Coal Co., Chieftain No. 2 mine, Dola, Harrison County, W. Va.—Contract closed by Deister Concentrator Co. for 8 SuperDuty Diagonal Deck No. 7 coal-washing tables and one Model 108-B Concenco revolving feed distributor, to handle $\frac{3}{4}$ x 0 fraction.

Johnstown Coal & Coke Co., Crichton No. 4 mine, Panther Gulch, W. Va.—Contract closed by Fuel Process Co. for 60-in addition to Belknap coal-washing facilities, including angle duplex washing with automatic specific-gravity control, media-recovery systems, desludging units, pumps and washed-coal conveying, and revision of raw-coal feed systems and crushing facilities; to wash 180 tph of 8 x $1\frac{1}{4}$ -in coal.

Coal River Mining Co., Hookersville, W. Va.—Contract closed with Fuel Process Co. for new Belknap coal-washing system unit, a 140-in angle duplex washer with automatic specific-gravity control, solution recovery desludging units and recovery pumps, and revision of raw-coal system and some tippie additions to provide for proper distribution of washed product; capacity of 200 tph of 5 x $\frac{1}{2}$ washer feed.

Seonor Mining Co., Loyal Mine, Saltsburg, Westmoreland County, Pa.—Contract closed by The Daniels Co., Contractors, Inc., for 1,000-ton raw coal storage, stage crushing, screening and conveying, dry-slack screening; DMS dense-media plant to wash $2\frac{1}{2}$ x $\frac{1}{4}$; 3-track tippie and truck-loading bins to handle $2\frac{1}{2}$ x 0, $2\frac{1}{2}$ x $1\frac{1}{4}$, $1\frac{1}{4}$ x $\frac{3}{4}$, $\frac{3}{4}$ x $\frac{1}{2}$ and nut-slack at 250 tph capacity.

New Books for Coal Men

The following publications by the U. S. Bureau of Mines are available only from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Prices are as noted below. All are 8 x 10 $\frac{1}{4}$ -in; paper.

Surface-water Seepage Into Anthracite Mines in the Southern Field, by S. H. Ash, H. B. Link and W. M. Romischer. Bulletin 539. 51 pp, plus maps. \$1.00.

Air Pollution, a Bibliography, by S. J. Davenport and G. G. Morgis. Bulletin 537. 448 pp. \$1.75.

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Kentucky Report . . . Begins on p 86

unit could stay continuously with the auger. The HD20 dozer has a torque converter, a very desirable feature for preventing jerking when moving the auger, Mr. Darst noted.

The seam, averaging 56 to 66 in thick, lies at an elevation of 3,600 ft. For the transportation job of 5 mi and a drop of 2,000 ft in elevation to the preparation plant, 20- to 25-ton trucks are being installed. Auger coal is mixed with the strip coal in variable quantities, depending on quality of the strip coal and sometimes all of the strip coal is thrown away, Mr. Darst said.

George W. Vaughn, Old King Mining Co., Hardburly, Ky., described auger work at the Hardburly mine, saying it has been "highly productive under favorable conditions." From March 1 to Sept. 30 of this year a Compton Model-36 machine with 42-in auger averaged 1,134 tons per 3-shift day, with a total of 16 men not including truckers. The coal is stockpiled and then loaded into mine cars for transportation to the preparation plant. Stripping was tried but given up because of the hard sandstone top.

Auger coal is 60% of the mine production and the balance is from underground mining. Seam thickness averages 52 in and the range is 48 to 56 in. Coal is faced with a 2-yd Lorain shovel and a TD24 dozer to an 18-ft highwall and the pit width ranges from 35 to 60 ft. Pillar thickness between holes is 6 to 12 in and maximum hole depth is 160 ft, Mr. Vaughn said.

At the close of the auger mining discussion period, Mr. Sisk said the Kentucky Department is favorable to all devices which will further the interests of the coal industry but views with concern attempts to take auger mining pillars in a haphazard fashion. If there is coal to be gotten behind the auger depth then sections of the highwall should be skipped to provide space for a 2-heading entry to conform with the law requiring two ways of escape and proper ventilation.

BRIDGE CONVEYOR RESULTS

C. L. Sherman, superintendent, Stephens Elkhorn Fuel Corp., Manton, Ky., described the use of Long Piggybacks with Joy 12BU loaders in 34-in coal. Application of the units has enabled the company to average 1,149 tons per day with a total payroll of 115 men including preparation plant, offices and the retail store (*Coal Age*, Sept. 1954, p 106).

James H. Graham, general mine foreman, Jewell Ridge Coal Corp., Tilford, Ky., describing the use of Long Piggybacks at the No. 4 mine (*Coal Age*, December, 1953, p 72), concluded, "I would like to say that the Piggybacks and the men who operate them have done a wonderful, if not amazing job for us and I think they could for you if you have the proper conditions and operate them properly. I believe I am safe in saying that as far as the Jewell Ridge Coal Corp.

is concerned the Piggybacks are here to stay."

Mr. Graham said that with the Piggybacks mining 48-in of coal the average has been 500 tons per loader and 50 tons per face man. Some of the hints he gave for successful operation were: (1) work them in fairly sound top and bottom, (2) do not timber too closely or maneuverability will be hampered, (3) limit conveyors to 300 to 325 ft, (4) drive places wide so large tonnage per cut will provide maximum loader efficiency, (5) to eliminate all unnecessary delays keep the face operations on a definite cycle, and (6) establish and maintain good relations with the men.

J. B. Long, president, Long Co., Oak Hill, W. Va., showed slides of Piggybacks in several mines and mentioned that the Jewell Ridge job, now four years old, was among the first to use the heavy duty Long conveyors with 25-hp drives and chains exceeding 40,000 lb tensile strength. For thin coal, conveyor pans are now being built which are only 8%

in high yet handle 3 tons per minute. The Long Co. is in the process of installing its Model 88 loading machine and Piggybacks in one of the large mines of eastern Kentucky in 30- to 34-in coal.

NEW STRIPPING LAW

Kentucky's Strip Mining & Reclamation Act was discussed by a panel consisting of the following three men of the commission: Henry Ward, commissioner of conservation, who is chairman; O. W. Chinn, director, and Mr. Sisk, representing the Department of Mines & Minerals. Mr. Ward said the commission is going very slow on the subject until fairly confident of the effects. Stripping is recognized as a perfectly good method of mining coal. The commission's interest is in the effect the stripping may have on other things such as damage by pollution of water, through erosion, etc.

Mr. Chinn described the Act, gave definitions of terms used and said the basic fee for a strip mine permit good for one year is \$50 plus \$10 per acre or fraction thereof. Although the commission may set the bond anywhere between \$100 and \$250 per acre, the minimum figure has been set for all permits issued so far.

The operator is required to: (1) cover the faces of the coal and where practical all toxic materials, roof coal, pyritic coal or shale which is acid producing or creates a fire hazard; (2) seal off any break-through creating a hazard; (3) impound, drain or treat water to reduce erosion, prevent damage to agriculture and avoid pollution of streams, etc.; (4) remove or bury metal, lumber and other refuse; and (5) grade banks where practicable and provide suitable vegetative cover.

ROOF-BOLT RECOVERY

In the 29-month period beginning May 1952, said J. William Bassett, West Kentucky Coal Co., his company has saved approximately \$120,000 by recovering approximately 250,000 roof bolts with only two lost time accidents. Most of this recovery was from the No. 11 seam and the balance from the No. 9. While average cost of a new bolt delivered to the working place is \$0.74 the reclaimed bolt is made ready to put in the working place at \$0.24.

A 3-man crew will average 300 bolts reclaimed per shift and seventy-five per cent of the reclaimed expansions are usable. The \$0.24 cost includes new expansions to replace the damaged ones. To date, hand wrenches only have been used but adoption of an electric wrench is expected with the result that the crew will recover 600 bolts per shift. A certified man spends about 75% of his time with the bolt recovery men and firebosses the balance of the time.

Recovery of nearly 300,000 bolts with only one lost time accident was reported by C. E. Parks, Miners Coal Co. This has taken place in the No. 11 seam of Fies Mine since the beginning of experiments in February, 1952. In the No. 9 seam, percentage of shells recovered is much smaller than in the No. 11. Some bolts have been used as many as five times. If a bolt has taken so much

EQUIPMENT APPROVALS

Ten approvals of permissible equipment were issued by the U. S. Bureau of Mines in September and October, as follows:

Joy Mfg. Co.—Types 6SC5PF-4 and 6SC5PFX-4 cable-reel shuttle cars; three 7½-hp motors, 500 v, DC; Approval 2-895A; Sept. 30.

Jeffrey Mfg. Co.—Type MM-78-A Molver; twenty ½-hp, and twenty-three 2-hp motors, 250 v, DC; Approval 2-1019; Sept. 22.

Browning Dust Collector Co.—Utility truck; 4-hp motor, 250 v, DC; Approval 2-1020; Sept. 23.

General Electric Co.—Type B-3/3-IDH-A1 1½-ton diesel locomotive; Approval 2403, under Schedule 24; Sept. 13.

Joy Mfg. Co.—Type ICM-2F continuous miner; two 100-hp, one 15-hp and four 7½-hp motors, 500 v, DC; Approval 2-1007A; Oct. 26.

Acme Machinery Co.—Model 275-SPRHJ air compressor; 50-hp motor, 250 v, DC; Approval 2-1021; Oct. 8.

Goodman Mfg. Co.—Type 666 Tractor Tread loader; two 50-hp motors, 220 v, AC; Approval 2-1022; Oct. 14.

Joy Mfg. Co.—Type X707-39 electrical assembly for a Model I-21 axial-flow fan; 5-hp motor, 440 v, AC; Approval 2-1023A; Oct. 28.

Joy Mfg. Co.—Type 12BU-10E loading machine with detachable Type PT Piggyback conveyor; six 4-hp motors, 250 v, DC; Approval 2-1024; Oct. 28.

National Carbon Co.—Model 1359-A (3-cell) and Model 1259-A (2-cell) flashlights; Approval 621; Oct. 1.



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Jones & Laughlin
STEEL CORPORATION — Pittsburgh

weight that the tensile strength has been exceeded and re-use would be dangerous that bolt would probably not be recoverable.

Mr. Sisk said the Kentucky Department of Mines & Minerals has approved bolt recovery but he warned that places from which bolts have been extracted should be barricaded off. Especially dangerous is the clod top of the No. 11 coal which falls without notice.

Roof control and general safety with continuous mining machines is much better than with other types of mining declared Earl R. Maize, U. S. Bureau of Mines, in his paper describing roof support methods at 5 operations using continuous mining, one of which is a European machine on long face. In 1952, only 1 fatality occurred at the face during the production of 8,215,000 tons by continuous equipment and so far as has been ascertained none occurred in 1953. Evaluation is difficult, however, because in many cases the continuous equipment was placed in the better roof areas. Roof bolting has been the most successful means employed with continuous machines. The Bureau is now engaged in work which may develop some device or scheme other than those now in use for roof support with continuous mining.

BELT FIRE HAZARDS

"Control of Fire Hazards for Conveyor Belting in Mines," a comprehensive paper by E. R. Traxler of The B. F. Goodrich Co. and read by F. J. Perlich, field representative, reported on studies of belt fires in the United States and England, described tests of belting for flame resistance and made recommendations for preventing belt fires.

Seven possible means to reduce chances for belt conveyor fires were listed: (1) use some type of flame resistant belting; (2) use high grade, well lubricated idler bearings; (3) design conveyor to permit good housekeeping; (4) provide maximum framework clearance; (5) use vulcanized belt splices where possible; (6) practice good servicing and maintenance of conveyors; and (7) use all possible automatic safety devices.

Mr. Perlich suggested the following automatic devices: "(1) centrifugal switches actuated by belts; (2) paddle switch in transfer chutes; (3) emergency-stop cord along full length of conveyor; (4) automatic sprinkler or rock dusting equipment; (5) thermal switch at discharge points; (6) motor overload switches; (7) self-aligning idlers to keep belt well trained; and (8) sequence starting and stopping of successive belts."

"In our opinion there is very little danger of belt conveyor fires with a standard rubber belt where the conveyor design is well engineered, where good housekeeping and good maintenance are practiced and where the proper automatic safety devices are used. As a further safeguard against belt fires, a type of flame resistant conveyor belting can be used," Mr. Perlich concluded.

"Scandura" P.V.C. belting was described by T. James Montgomery of the Scandinavia Belting Co. This belting, de-

veloped in England and consisting of polyvinyl chloride thermoplastic compound over a cotton interwoven base without plies, was introduced in the British coal industry in 1946. It is now made in the United States and is reported to be widely used in many industries in the United States, especially where heat and flame resistant qualities are required.

In a brief preliminary report on mine fires and explosions in Kentucky for the year that has elapsed since the last Institute meeting, Mr. Sisk said there were 22 fires and no explosions. Two ignitions of methane occurred. Of the fires, 14 resulted from forest fires igniting coal exposed by stripping or augering operations. Of the other 8 fires, 5 were of electrical origin. Two of the three belt fires resulted from friction and the other cause was unknown. One of the two methane ignitions was from smoking and one from electrical equipment.

News Briefs . . . From p 120

U. S. Steel Div. Honors Utah Coal Miners for Safety

Awards and certificates were presented Oct. 25 to 18 coal miners with a total of more than 425 yr of service in the Columbia mine, Columbia-Geneva Steel Div., U. S. Steel Corp., Dragerton, Utah. The ceremonies cited employees completing 20, 25 and 30 yr with the company. Guests at the award dinner, in addition to those receiving citations, were 30 other "old timers" whose service of more than 20 yr had been recognized in earlier celebrations. The 48-man total shows a combined service record of 1,214 yr and an average of 25.3 yr. F. V. Hicks, general superintendent, coal mines and quarries, presented the awards and certificates.

And For Your Information . . .

Plains Township, near Wilkes-Barre, Pa., has passed an ordinance requiring stripping operators to post bond or an insurance policy of \$50,000 to \$100,000 to provide protection for persons or property in the township. Operators were given 10 days, up to Nov. 25, to post security. In addition, operators are forbidden to work their mines between 10 pm and 6 am on weekdays and between 10 pm Saturday and 6 am Monday. Blasting is limited to the hours between 8 am and 6 pm. The township solicitor has been directed to draft an ordinance to require refilling of strip pits.

A \$2,500,000 suit has been entered by Charles E. Yates, coal operator of Boyd County, Ky., against United Fuel Gas Co. Mr. Yates charges that the gas company, which serves a large area in eastern Kentucky, is trespassing in laying a pipe line across certain tracts in Boyd and Carter Counties to which he lays claim. He says the pipe line will prevent him from mining some 50,000 tons of coal worth over \$5 per ton. Mr. Yates also seeks an injunction forbidding completion of the pipe line.



COAL MEN ON THE JOB . . .

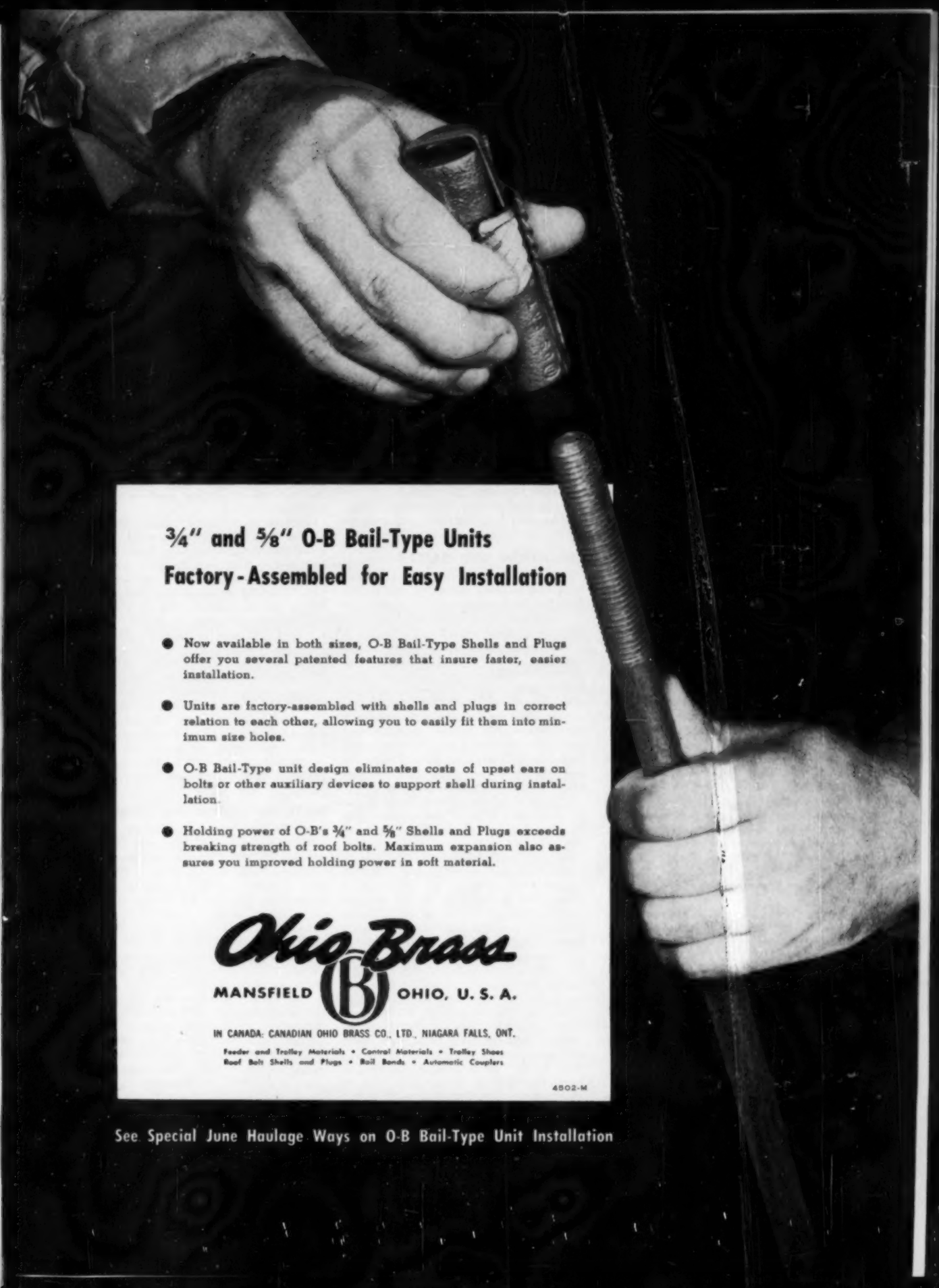
J. M. REID, general manager, The Hudson Coal Co., Scranton, Pa., receives plaque from J. V. Berry, safety engineer, Bethlehem Mines Corp., Johnstown, Pa., in recognition of services as 1953-54 chairman of Coal-Mining Section, National Safety Council, at Chicago, Oct. 21.

Consumers' Power Co. will install another 135,000-kw steam-turbine generator at Muskegon, Mich., bringing capacity of the company's B. C. Cobb plant to 450,000 kw. The new unit is expected to go on the line in 1957.

The Independent Petroleum Association of America declared Nov. 5 that efforts to solve the problem of excessive oil imports without legislation have not been effective and that it will ask the 84th Congress to impose quotas that will limit imports.

Coal already was being mined and shipped early in November at the rate of 21,000 tons per month for shipment by Christopher Coal Co., Div. of Pittsburgh Consolidation Coal Co., to the Ohio Valley Electric Corp.'s new steam-electric plant now under construction near Gallipolis, Ohio. By February, 1955, the producing company's shipments will be running at the rate of 1,500,000 tons per year, according to C. R. Nailler, Christopher's president. The Christopher-OVEC contract, which will run for 15 yr, is expected to raise the coal company's output to about 5,200,000 tons annually.

Damages of \$23,328.22 against the UMWA and District 28 were awarded the Bev Coal Co. Nov. 17 by a U. S. District Court jury in Abingdon, Va. In its suit the firm had asked \$300,000 in damages it said resulted from a strike of 2,000 miners at the Clinchfield Coal Co., Dante, Va., in April, 1953. The company maintained that it had to cease operation since the UMWA forced Clinchfield to stop buying coal from its nonunion mine and later to refuse to renegotiate its lease.



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NCA CONVENTION .. Begins on p 82

insure that the proper job is done in the future. As one speaker put it: "Are markets worth saving? If so, now is the time to do it."

TRANSPORTATION, LAW, TAXES

R. E. Lee Hall, counsel for NCA, presided at the Thursday workshop-luncheon devoted to committee reports and discussion on transportation, taxes and law.

W. F. Schulten, vice president, Pittsburgh Consolidation Coal Co., Pittsburgh, and chairman of the transportation committee, stated in his report that freight rates should at least reflect the savings claimed by the railroads as a result of dieselization, and that further improvements in transit charges for coal might be gained by eliminating the 4% tax on railroad haulage, removing unfair demurrage provisions and abolishing tariffs on coal cleaned-in-transit.

Among the positive achievements of the transportation committee, working through NCA officials, Mr. Schulten listed the defeat of the "Time Lag" bill, the organization of a rates subcommittee for continuous study of freight-rate developments and the publication of a monthly bulletin providing current statistics of railroad activity. The committee recommended that the association take an active interest, through appointed representatives, in various national or regional groups contributing to transportation policy.

Speaking on the past achievements, present activities and future plans of the law committee, Chairman Robert G. Kelly, of the law firm of Jackson, Kelly, Holt & Moxley, Charleston, W. Va., in a humorously pointed report, explained that NCA's law committee is non-existent. There is no such committee. In reviewing the legal problems of the industry since the 1917 organization of NCA, Mr. Kelly listed such milestones as President Wilson's fuel policies, NRA, the Guffey laws, the Ickes-Lewis and contentions surrounding the UMWA welfare fund, all of direct concern to the association's membership. All these might well have had the attention of an NCA law committee—if there had been one, Mr. Kelly said.

Activities of the special tax committee, reported by Chairman James F. Bisset, controller, Pittsburgh Consolidation Coal Co., Pittsburgh, included in 1954 the insertion in the new Internal Revenue Code of a definition of the term "property" as employed in the computation of allowances for depletion. In this regard, an election now is available to combine two or more operating interests comprising all or a portion of an operating unit and thereafter to treat such combination as one property.

Other important modifications in the 1954 code include clarification of procedures in handling depletion accounts in the event of operating losses and settlement of the problem of deductibility, as ordinary business expenses, of contributions to the UMWA Welfare and

Retirement Fund. Still other changes, of perhaps less-frequent application, affect the aggregation of non-operating mineral interests, the definition of ordinary treatment processes, an increase from \$75,000 to \$100,000 in the amount deductible as exploration expenses in one taxable year and deduction for accrual of backfilling costs, which now appears to be an estimated expenditure allowable as a deduction during years beginning after Dec. 31, 1953.

Following the committee reports, a panel presentation of matters to be considered by management in planning the purchase of the properties or stock of another company was made by J. N. Griffin, attorney; J. M. Cooper, special adviser to NCA tax committee; F. F. Estes, transportation director, NCA; and W. B. O'Brien, assistant counsel, NCA, all of Washington, D. C. They posed as officials of ABC Coal Corp. in planning the purchase of the property or stock of XYZ Coal Co., in a hypothetical situation. In the presentation and follow-up discussion, recent changes in tax laws applicable to such negotiations, procedures in dealing with XYZ stripping contractors, and transportation and marketing factors were explained.

EDUCATION AND SAFETY

"The coal industry is dragging its feet compared to other industries, and it will deserve a lack of interest among students if it continues to ignore them," was the warning of Henry C. Woods, chairman of the board, Sahara Coal Corp., Chicago, Ill., in his report as chairman of the vocational training and education committee at the joint workshop-luncheon with the safety committee. Providing opportunities for summer and permanent employment for college students and graduates, and taking an active interest in high-school curricula in mining are methods by which NCA members can help themselves and the students.

Noting the coming development of the St. Lawrence Seaway, the national grid of oil and gas pipelines, dieselization of the railroads and so on, all coming to pass over coal's opposition, Mr. Woods stated that apparently coal has lost its influence as an opponent. Therefore, it is time for the industry to look forward to its admittedly bright future, a future that will demand the talents of well-trained engineers.

With safety statistics indicating that the 1954 record will lag the industry's safety performance in 1953, according to S. Austin Caperton, president, Slab Fork Coal Co., Slab Fork, W. Va., and chairman of the safety committee, greater effort will be necessary to increase safety and even to hold performance at current high levels. Some company, mine and individual records are nothing short of phenomenal, Mr. Caperton said, and it should be the purpose of everyone in the industry to see that these records are duplicated everywhere.

One of the functions of NCA's safety department is to cooperate in a liaison effort to present an industry viewpoint

to the Bureau of Mines when new schedules are made or old ones revised, and in other instances in the bureau's administration of the Federal Coal Mine Safety Act. Serving on this liaison committee are Mr. Caperton for NCA; M. J. Ankeny, Bituminous Coal Operators Association; James Benson, Southern Coal Producers Association, and Charles Ferguson, United Mine Workers. The co-operative effort of NCA also is devoted to accident-prevention training, Holmes Safety Association work, institute and district safety programs, and other outlets, Mr. Caperton reported.

In discussion, Mr. Woods raised the question as to whether a federal safety law really is enforceable all over the nation in view of varying conditions. In reply, James Westfield, assistant director for health and safety, USBM, Washington, explained that Public Law 552, the Federal Coal Mine Safety Act, is general and recognizes the fact that there are differences in natural conditions. The law is a product of the industry itself, and most of its provisions are based upon lessons learned from bitter experience. We are getting somewhere, Mr. Westfield said. We are not defending violators, this law can work, and there is appeal machinery.

William J. Schuster, safety director, Hanna Coal Co., St. Clairsville, Ohio, noted that the code requires fire-resistant conveyor belting and inquired whether there is such and where it may be had. Mr. Westfield reported that Bureau of Mines officials are working on a set of standards for the guidance of belt manufacturers, and on a permissibility schedule applying to belt conveyors.

David L. Francis, president, Princess-Elkhorn Co., Huntington, W. Va., making the point that duplication of mine inspections by state and federal agencies is a burden to operators and taxpayers, suggested study of the possibility of having the bureau establish a set of inspection standards, after which inspection duties would be turned over to the states.

NATURAL RESOURCES, LAND USE

At the joint workshop-luncheon of the natural resources and land use committees, L. Newton Thomas, president, The Carbon Fuel Co., Charleston, W. Va., and chairman of the natural resources committee, reported on foreign residual oil and natural gas. A. J. Christiansen, secretary, Illinois Coal Strippers Association, reviewed the year's efforts of the land use committee in promoting improved reclamation of stripped land and its return to productivity.

The results of the campaign against imported residual oil have been worth the effort, Mr. Thomas declared, in explaining how the concerted opposition of coal and other interested agencies have stemmed the tide of ever-increasing imports of residual. Furthermore, the campaign has resulted in stabilization of the price for residual along the eastern seaboard, resulting in a slight recovery of some business lost to residual oil. The Foreign Oil Policy Committee, a joint effort of the coal industry (including the UMWA), the railroads, domestic oil pro-

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ducers and railroad brotherhoods, should receive a major share of the credit for focussing attention on the problem, Mr. Thomas said. On the basis of accomplishments to date, the industry can be optimistic concerning a substantial and permanent reduction in residual oil imports.

Turning to a discussion of natural gas, Mr. Thomas reported the formation within the natural resources committee of a subcommittee on natural gas, headed by Rolla D. Campbell, general counsel, Island Creek Coal Co., Huntington, W. Va.

After a comprehensive study of the problem, the subcommittee recommends that the coal industry seek congressional amendments to the Natural Gas Act which would (1) empower the Federal Commission to effect the conservation of natural gas in its sale and distribution, (2) confer jurisdiction on the FPC over direct sales of natural gas, (3) add standards that would permit the FPC to weigh the prospective impact of proposed natural gas service upon employment and the nation's economy, (4) broaden FPC power over proposed imports and exports of natural gas, (5) empower the FPC to fix minimum as well as maximum rates and (6) provide standards which would empower the FPC to direct the flow of natural gas to superior uses. The 1953 annual report of FPC indicates support for most of these provisions, Mr. Thomas noted.

COAL AND MOBILIZATION

Concluding feature of the two-day

convention was the NCA annual banquet Thursday evening with Dr. Arthur S. Flemming, director, Office of Defense Mobilization, Washington, as guest speaker, and L. Russell Kelce, president, Sinclair Coal Co., as toastmaster.

The basic aims of Soviet Russia have not changed and she is capable of launching an attack upon the United States, Dr. Flemming declared, in setting forth the reasons behind the administration's program of developing a broad mobilization base. The problem now is to identify gaps in this base, and follow-through demands that the government provide incentives to industry to have these gaps filled. The first order of business is to fill our strategic stockpiles as quickly as possible, then to turn to long-term objectives, discounting foreign supplies. The long-term phase already has been entered in some instances, Dr. Flemming reported, in explaining that materials in the Nation's stockpile are not hanging ominously over the market.

In explanation of how this policy affects coal, Dr. Flemming said that the Interdepartmental Committee is a result of the President's conviction that coal is vital in defense, and if the industry's volume of production is not at a level to permit us to meet the needs of stepped-up mobilization, then the director of ODM, as chairman of the Interdepartmental Committee, is to suggest ways of getting the industry up to this level. Industry and government must travel in partnership to solve the problems which impede progress toward this level of preparedness.

coordinating the activities of the general sales organization and the engineering department, and also working on special assignments for F. L. Griffith, general sales manager of the conveyor and rubber divisions. Arthur W. Fasold has been named assistant to the general sales manager of Hewitt-Robins conveyor and rubber divisions. Mr. Fasold joined Hewitt-Robins in 1947 as an estimator in Charleston, W. Va., and in 1948 became a field engineer. Since August, 1953, he has been assistant manager of the commercial research department at the company's executive offices in Stamford.

AC&C Pittsburgh Manager

W. T. Kyle has been appointed Pittsburgh district sales manager for the wire rope divisions of American Chain & Cable Co., Inc. Mr. Kyle, who will supervise sales in West Virginia, Ohio, western Pennsylvania and Kentucky, joined American Chain & Cable in 1939 and has been Ohio representative for the wire rope divisions since 1947. He succeeds Warren W. Runkle, who has been appointed New York-New England district sales manager.

U. S. Rubber Sales Head

Matthew J. Delehaunty has been named manager of mechanical goods sales for the mechanical goods division of United States Rubber Co., with headquarters at the company's Passaic, N. J., plant. Mr. Delehaunty joined U. S. Rubber in 1922, became a mechanical goods salesman in 1937 and was named Pittsburgh branch manager in 1949. He was made manager of industrial sales last year, and manager of commodity sales last June.

Lytle Heads Atlas Explosives

Atlas Powder Co., Wilmington, Del., has named W. Clayton Lytle, formerly general manager of the Explosives Dept., general manager of the Chemicals Dept. Max E. Colson, formerly director of operations of the Explosives Dept., is now general manager of that department. Willis E. Collins Jr., formerly director of explosives sales, has been named assistant general manager of the department. The new sales director is George W. Thompson, who had been assistant to Mr. Collins. Harry L. Moat was named director of explosives production. Previously, he had been assistant to Mr. Colson.

Clarkson Represents Gundlach

T. J. Gundlach Machine Co., Belleville, Ill., has named Clyde E. Clarkson, former vice president and director of Clarkson Mfg. Co., as the western representative. Mr. Clarkson will headquarter in Denver, Colo.

Twin Disc Promotes Two

Twin Disc Clutch Co., Racine, Wis., has named R. C. McRoberts assistant sales manager, Hydraulic Div., and J. B. Schubeler manager, export sales. Mr. McRoberts joined Twin Disc in 1941, and has been test laboratory supervisor, sales engineer and service engineer of the Hydraulic Div.

Among the Manufacturers

B-E Promotes MacDonald

Lawrence E. MacDonald has been appointed general sales manager for the Bucyrus-Erie Co., S. Milwaukee, Wis. A graduate of the University of Chicago, Mr. MacDonald has served the company for over 28 yr and since 1949 has been sales manager, excavator distributors. Previously he had served as a sales representative and manager of various sales and districts.

Wilmot Expands Staff

Wilmot Engineering Co., Hazleton, Pa., has announced several additions to its engineering and sales personnel as a part of its program of product diversification. Jordan H. Rockefeller and Ralph Edfort have joined the engineering department at the White Haven, Pa., plant. Mr. Rockefeller has been with the Lehigh Valley Coal Co. since 1920, where he was assistant mechanical engineer since 1935. Ralph Edfort came from the Landis Machine Co., where he served as a designing engineer. Otto von Perbandt, who recently joined Wilmot as contracting engineer, Coal Preparation Equipment Div., has assumed a similar responsibility for sales of the new Ore Concentration Equipment Div. Henry Otto has been placed in charge of sales for both equipment divisions in the western Pennsyl-

vania and eastern Ohio territories. He formerly represented the company in the northern Pennsylvania anthracite area. Gene F. Scarborough has been named representative in the Atlanta territory for Wilmot's Keystone Rivetless Chain Div.

Hendrick Adds Sales Engineer

Hendrick Mfg. Co., Carbondale, Pa., has appointed E. Donald Schreckengost sales engineer, specializing in the application of Hendrick screening to coal-preparation problems of customers and prospects. Before joining Hendrick, Mr. Schreckengost was associated with the Freebrook Corp., Kittanning, Pa., where he was preparation manager for the past 8 yr.

Hewitt-Robins Promotions

Hewitt-Robins, Inc., Stamford, Conn., has appointed Hamilton M. Ross manager of operations, Conveyors Div., and Harold E. Murken manager of conveyor system sales. Mr. Ross, who joined the company in 1941, had been manager of Hewitt-Robins' plants in Passaic and Philadelphia and his new position will carry with it the additional responsibility for the sales staff in Passaic. Mr. Murken, with Hewitt-Robins since 1927 and formerly product sales manager at Passaic, will be located at the New York office,



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duPont Explosives Appoints

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has promoted Richard D. Hedreen, formerly assistant manager, Chicago sales office, Explosives Dept., to manager of the department's technical-service section, succeeding the late Harold A. Lewis. Fred B. W. Hynes, who joined the company in 1947, succeeds Mr. Hedreen. A graduate of the University of Washington, Mr. Hedreen joined du Pont in 1937, as a chemist. Mr. Hynes, a graduate of the Colorado School of Mines, was technical and sales representative in Seattle and Denver until 1953. Since early this year he has been an administrative assistant in the Wilmington general sales office.

Youngstown Moves Sales Heads

Youngstown Sheet & Tube Co., Youngstown, Ohio, has named John M. Tuthill, since 1952 assistant general manager of sales in Chicago, general manager of sales, with headquarters in Youngstown. John P. DeHetre, an assistant general manager of sales, succeeds Mr. Tuthill in Chicago. Mr. Tuthill joined Youngstown as assistant manager of flat-rolled sales in 1935, and was promoted to manager in 1950. Mr. DeHetre joined the company in 1938 as an assistant field engineer in Los Angeles. Also announced by the company was the promotion of P. G. Boyd, Chicago district sales manager, to the newly created position of western manager of sales, supervising the company's district sales offices in Chicago, Des Moines, Grand Rapids, Indianapolis, Kansas City, Milwaukee, Minneapolis and St. Louis. C. Hix Jones, Detroit district sales manager, succeeds Mr. Boyd as Chicago district sales manager, and David H. Goodfellow, assistant Detroit district sales manager, succeeds Mr. Jones.

Stearns Magnetic Appoints

Stearns Magnetic, Inc., Milwaukee, Wis., has appointed R. M. Miller vice president. Mr. Miller, who joined Stearns in 1946 and was formerly manager of the company's transmission plant, will be responsible for the sales, production and engineering activities of the entire company.

Armco Drainage Expands

Armco Drainage & Metal Products, Inc., Middletown, Ohio, a subsidiary of Armco Steel Corp., has announced major expansion of its activities in prefabricated steel buildings, involving a re-vamping of the company's development programs, sales plans, and production facilities to provide an expanded line of steel buildings and building products. First step in the expansion program is the organization of a new department, called the steel buildings department, headed by D. H. Malcom, former manager of the marketing service department for Armco Steel. Robert Blickensderfer, who has been responsible for the company's progress to date in the field of steel buildings, will devote his entire time to coordinating the technical phases of the building-products development program, and will also work with state and local governments in the modernization and revision of building codes. A. H. Baldwin has been appointed assistant to the manager of the new department.

Thew Acquires Dixie Crane

Arrangements have been completed by the Thew Shovel Co., Lorain, Ohio, for purchase of the controlling stock of Dixie Crane & Shovel Co., Inc., Harrisburg, Pa., it was recently announced by C. B. Smythe, Thew's president. The acquisition was made because Thew did not participate in the low-cost crawler-

and rubber-tire-mounted $\frac{3}{4}$ -yd 6-ton shovel-crane market, said Mr. Smythe. Dixie shovel-crane, which under the agreement will continue to be manufactured and distributed by Dixie Crane under that brand name, are available on crawler mountings and factory-mounted rubber-tire carriers. The turntables alone can be mounted on new or used commercial-type truck chassis in the field, or on piers, docks, barges, etc. In the lowest price bracket, the Dixie line gives heavy-duty performance and is fully convertible to shovel, crane, clamshell, dragline or hoe, the company points out.

ESCO Names Vice Presidents

Electric Steel Foundry Co., Portland, Ore., has appointed R. W. de Weese vice president in charge of sales, and Jefferson J. Davis vice president in charge of product divisions. Mr. de Weese, a veteran of 14 yr of service with ESCO, has served as manager of the High Alloys Div., as assistant to the president, and as managing head of the company's metallurgical and inspection departments. Mr. Davis joined the Seattle branch of the company in 1936, and since 1945 has been manager of the Construction Equipment Div.

I-H Reassigns Managers

International Harvester Co., Chicago, has announced the following transfers of its motor-truck district managers: J. O. Lambeth, formerly district manager at Charlotte, N. C., has been transferred, in the same capacity, to Nashville, Tenn.; C. T. Helin, from district manager at Houston, Tex., to Charlotte; and P. C. Johnson, from San Antonio, Tex., to Birmingham, Ala.

Dodge Elects Vice President

Carl W. Petersen has been elected vice president and works manager of Dodge Mfg. Corp., Mishawaka, Ind. The announcement was coincidental with the retirement, under the regular Dodge retirement plan, of Edgar M. Carver as first vice president after 45 yr of service with the company. Mr. Carver will continue to serve as a member of the board of directors and also as a consultant to the corporation. Mr. Petersen, who joined the company in 1923, moves up from general superintendent, after serving in that capacity since 1942.

Ruberoid Builds Calif. Plant

The Ruberoid Co., New York, has announced plans to build a new plant in California. The announcement marked the 68th anniversary of the founding of the company. The West Coast plant will be built on about 22 acres recently acquired in Los Angeles, and will manufacture the full line of Ruberoid asphalt roofings and later may be expanded to produce asbestos-cement and other products. The appointment of Wilbur G. Neel as sales manager of Ruberoid's Salt Lake City, Utah, district also has been announced. Mr. Neel, who has spent his entire working career in the building materials business, joined Ruberoid last March and has served as an executive



Eimco Completes Facilities for Filtration Research

ITS NEWLY OPENED Research and Development Center in Palatine, Ill., near Chicago, is the filter industries' first facility devoted primarily to research and development in the field of liquid-solids separation, reports the Eimco Corp., Salt Lake City, Utah. Built as part of Eimco's program to better serve the industries utilizing filtration, the fully equipped research center will have the two-fold goal of studying all possible improvements in present filtration equipment and techniques, and of developing new processes and techniques and the equipment needed to make them practical. The center is equipped to test samples and provide pilot-plant determinations to industries with filtration problems and will also house the company's Central Div. sales and engineering offices.

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with
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WIRE ROPE!

In this busy open-pit mining operation, loading shovels and strippers are equipped with Yellow Strand Wire Rope—chosen by mine officials because of its longer, trouble-free service life.



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Yellow Strand spools smoothly on the drum—there are fewer kinks, many more hours of service. Yellow Strand is fatigue-resistant—stronger wire is carefully spun in precision strands, then into internally-lubricated ropes of greater strength. Yellow Strand is backed by a Speedi-Service program that assures correct lines exactly when you need them. *Yellow Strand is your best bet for lowering your cost-per-ton.*

Your nearby Broderick & Bascom distributor can show you the profitable difference in Yellow Strand Wire Rope and can show you how *free* Speedi-Service works. Call on him or write to Broderick & Bascom for his name and address.

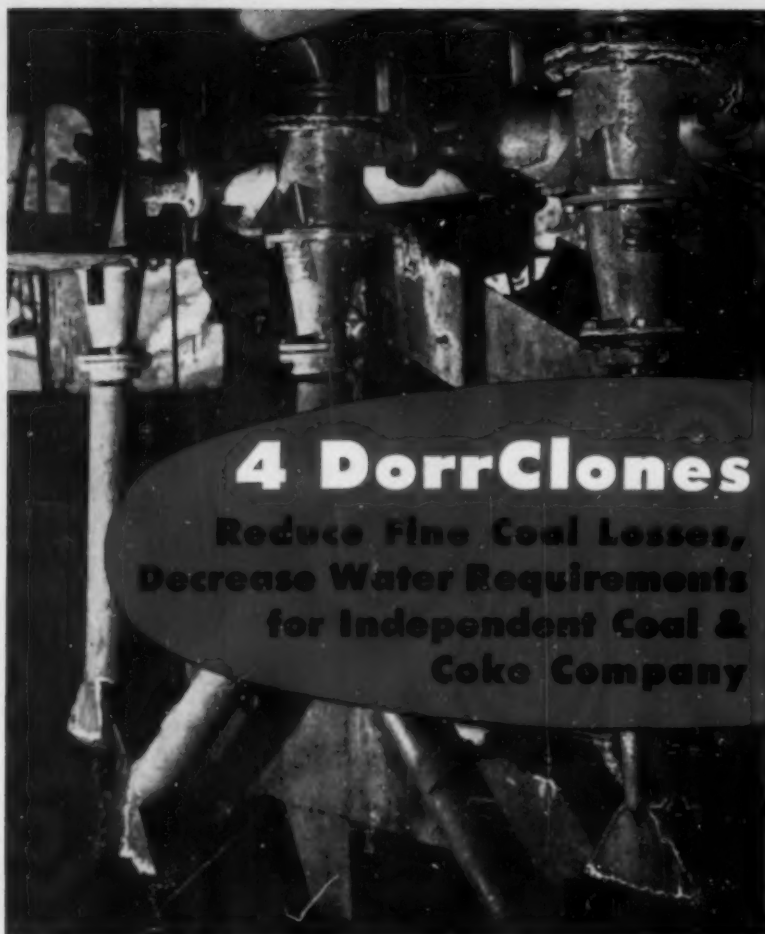
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4 DorrClones

Reduce Fine Coal Losses,
Decrease Water Requirements
for Independent Coal &
Coke Company

Battery of three 6" dia. DorrClones dewatering underflow from secondary cone.

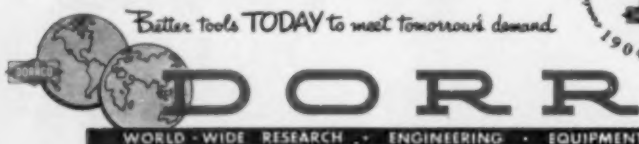
Here are two good examples of the DorrClone's ability to improve coal washing flowsheets . . . both at the same plant of Independent Coal and Coke Company in Utah. Problems were recovery of fine coal losses and dewatering of cone underflow prior to drying. Producer installed one 12" dia. DorrClone and three 6" dia. DorrClones equipped with wear resistant liners.

Here are the results:

1. Recovery of 8 additional tons of fine coal per hour.
2. 75% reduction in volume of water to waste.
3. 30% decrease in process water requirements.

These results are typical . . . concrete proof of the savings you can realize with these low cost units. What's more, DorrClones can now be supplied with the special Type CB liner which solves the serious wear problem encountered in washing plants. We'd like to tell you more about how DorrClones can be used in your flowsheet. Just drop a line to The Dorr Company, Stamford, Conn.

DorrClone is a trademark of The Dorr Company Reg. U. S. Pat. Off.



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Offices, Associated Companies or Representatives in principal cities of the world.



assistant to E. J. O'Leary, sales vice president, since that time.

G-E Plans West Coast Facility

General Electric Co., Syracuse, N. Y., has established a new communication equipment center in Redwood City, Calif., to serve more adequately the greatly increased demand for G-E 2-way radio equipment in the western states. The new center is expected to be completed by the first of the year, and will be devoted to offices for G-E western region communication equipment sales, product service, final assembly and storage of 2-way radio communication equipment. Irvin H. Webster has been appointed manager of the new center.

And For Your Information . . .

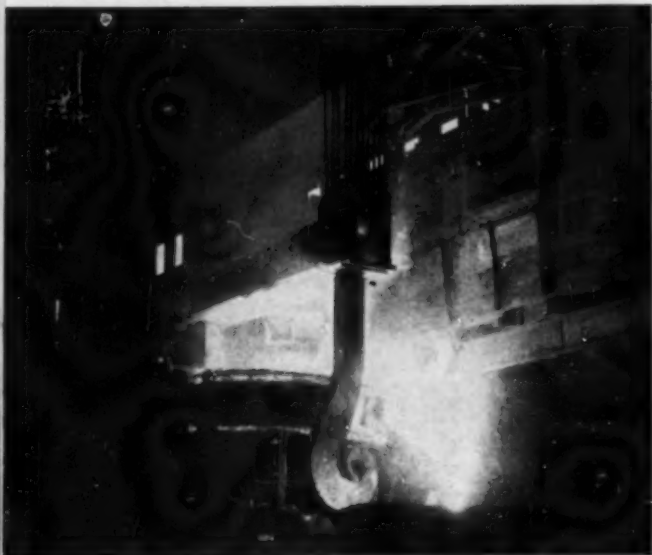
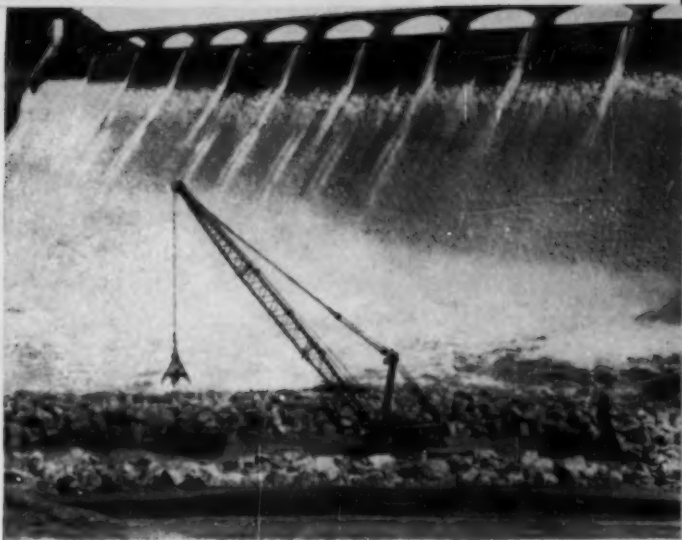
Goodman Mfg. Co., Chicago, held its 9th annual Old-Timers Banquet Nov. 3. Diamond pins were presented to eight employees who completed 35 yr of service this year, and to 17 who reached the 25 yr mark. With these presentations, the number who have reached or passed the 35 yr status is 68, while the 25 yr or more group totals 148. All are actively at work, the majority at the Chicago plant, but with branch office districts well represented.

Koehring Co., Milwaukee, Wis., has appointed the Dalrymple Equipment Co., 2635 Summer Ave., Memphis, Tenn., exclusive distributor handling the complete Koehring line of heavy-duty construction equipment along with products manufactured by the Parsons Co., Newton, Iowa, and Kwik-Mix Co., Port Washington, Wis., both Koehring subsidiaries. Territory for the new distributor includes almost the entire state of Mississippi, and parts of Arkansas and Tennessee.

Berry Div., Oliver Iron & Steel Corp., Pittsburgh, Pa., has opened new sales and engineering offices at 4227 W. 43d St., Chicago, and appointed W. L. Denniston as Chicago-district sales engineer. Formerly in the company's home office in Pittsburgh, Mr. Denniston will handle sales and engineering for the division's hydraulic pumps, motors, controls and transmissions.

Baldwin-Lima-Hamilton Corp., Construction Equipment Div., has consolidated its manufacturing program to include the production of rubber-tired one- and two-engine carriers for certain types of machines in its power shovel, crane and dragline line. The development program, launched 4 yr ago, is presently confined to machines in the medium and heavy classes. The Lima design covers cranes from 20 to 50-ton capacity. Carriers of outside manufacture will continue to be utilized by Lima for certain other units.

Gar Wood Industries, Wayne, Mich., has appointed C. W. Snider assistant to the director of sales. Mr. Snider has been assistant sales manager of Gar Wood truck equipment since April, 1953, when he came to Gar Wood. Previously, he was assistant to the president of Sparks-Withington Co., Jackson, Mich.

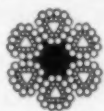


PROVING EXTRAORDINARY SERVICE—A Hercules Flattened Strand crane rope delivered 18 months service, compared to 6 months for ordinary rope. It performed equally well as a clamshell bucket rope. On a hot ladle

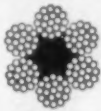
crane it outlasted round strand rope by 4 to 1, and still tested at higher-than-rated strength. It was chosen for its super strength to haul the car on the continent's largest cableway at Kitimat.

Can Flattened Strand solve your special wire rope problem?

Hercules Flattened Strand is a special kind of wire rope that provides extraordinary service on special kinds of jobs.



Flattened Strand



Round Strand

The key to the difference is the triangular shape of the strands. Notice how the strands support each other; how the rope circumference is almost perfectly round; and how the core is smaller. There is 10% more steel in Hercules Flattened Strand than in round strand ropes of the same diameter. That means 10% more strength and 10% greater safety. Flattened Strand wears longer and more evenly . . . and is easier on sheaves and equipment.

If you can use this Super-rope, you'll soon begin saving time, labor, money. Why not investigate?

Because Leschen pioneered and perfected Hercules Flattened Strand wire rope, Leschen is your best source of additional information. Ask your Leschen man, or write for "The Flattened Strand Story."

LESCHEN WIRE ROPE DIVISION

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CONVERT NOW from TRACK to TRACKLESS

"TRACKLESS MINING" with conventional cutters, loaders and shuttle cars provides the most economical and efficient mining system available today.

These trackless advantages are yours by having your track-mounted cutters and loaders converted to trackless operation - Lee-Norse "conversions" that result in greater savings to you through...

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- Lost time for conversions minimized.
- Obsolescence losses due to possible new continuous miner developments are held to a minimum.

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Specialists in Coal Mining Equipment

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Write today for complete facts on converting
your track mounted equipment.

Joy Mfg. Co., Pittsburgh, Pa., has appointed Samuel S. Douglas special representative to the iron and steel industry. Prior to joining the Joy organization as a representative in the Pittsburgh district in 1948, Mr. Douglas was vice president of engineering and sales, Arms Franklin Corp., Franklin, Pa.

Leschen Wire Rope Div., H. K. Porter Co., Inc., has named Herbert L. Waltman manager of the Pacific Northwest Dist., covering Washington, Oregon, western Idaho, Montana and North Dakota, with headquarters in Seattle. Mr. Waltman joined Leschen as a salesman in 1941 and formerly was manager of the Leschen Denver sales district.

Hose Accessories Co., Philadelphia, has appointed the Durrie Sales Co. as its representative in the Illinois, Indiana and Iowa marketing area. The headquarters of the Durrie organization are at 605 W. Washington St., Chicago 6.

ME-MM Group Meets

Begins on p 96

with a hard-hitting maintenance group, said James Reilly, vice president, Hanna Coal Co., St. Clairsville, Ohio, in opening his discussion of the economics of the coal industry. When machines were first put in the coal mines, they were not used properly and, as a result, there were failures. The question of whether to load coal with a machine needing repairs or to stop and fix it became debatable. It finally resolved into a question of which action would make money for the company, Mr. Reilly declared.

The best production and maintenance costs are not always where the best qualified men are in charge, but where supervisors have the capacity to get men to co-operate. Keeping machines running consistently and economically is the big job in reducing costs. If one-tenth as much effort was spent on human relations as on getting training, it would save the coal industry more money than all the inventions to be made in the next 5 yr. By understanding human beings and applying the proper training, mining costs can be reduced, Mr. Reilly said.

NEW DEVELOPMENTS IN MINING

There has been a growth in confidence among mining men that they will be able to put the coal industry back on its feet and solve its problems, declared G. R. Spindler, director, School of Mines, West Virginia University, Morgantown, W. Va.

The industry is making progress in output per man-shift but continuity of performance is the big problem to be solved in the future. Continuous mining will continue to expand and more interest can be expected in longwall mining, Mr. Spindler said.

We don't know enough about the forces used in cutting coal, and research is being carried out to learn more about the process. Cutting probably can be improved by: (1) changing the speed of bit travel; (2) changing the angle of the bit with respect to the coal face; and (3)



wise old owl says...

savings on track cleaning costs have paid for the "Canton" Track Cleaner in a few months (names on request). For every 100 tons of spillage you clean up, you also save buying and applying up to 200 tons of rock dust.

Mine inspectors like a clean haulage road. The "Canton" Track Cleaner removes two hazards . . . unsure footing, and accumulation of explosive coal dust . . . and makes you money too.

Write today for full descriptive folder on the "Canton" Track Cleaner.



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2057 Dueber Ave., Canton, Zone 6, Ohio
Other Self-liquidating Equipment . . . Rock Dusters . . . Electric
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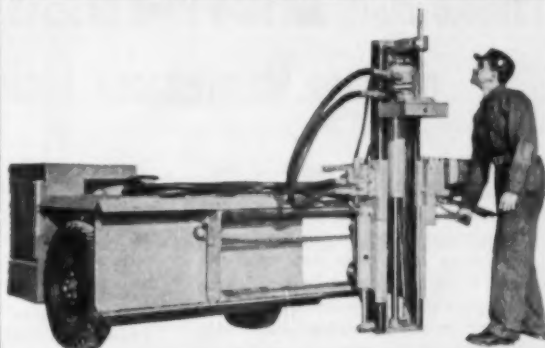
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FLETCHER ROOF CONTROL DRILLS deliver high-capacity roof bolting performance shift after shift—keep ahead of big-production mining units, eliminate bottle-necks. Packed with power and equipped with complete hydraulic controls they install bolts faster, move from room to room faster, spot for the next bolt faster. Because they are simple and rugged, maintenance and down time is cut to a minimum. You'll be surprised how little it costs to own a Fletcher drill—and how much more roof control satisfaction it can give you. Write us today for full information.

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**EXPOSED FOR YEARS
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... and still serving

SINCE 1933

SINCE 1933

Transite Mine Service Pipe resists corrosion — provides Maintenance Economies

In mine after mine, owners and operators have found from experience that Transite* Pipe strongly resists the highly corrosive action of acid mine water—from the inside and from the outside. In constant use, this asbestos cement pipe has withstood the ravages of severe mining service conditions for periods of fifteen years and more without replacement. And these installations can be expected to serve for years to come, as efficiently and economically as when first installed.

Transite Pipe has other advantages important to mine operations. Light in weight, it is easy to handle... tight

"factory made" couplings make installation easy. It is tough and strong... its flexible couplings enable lines to be laid around curves... often without use of fittings, a big advantage in restricted mine passages.

Many mine owners are using Transite Pipe for uses other than drainage. Among these are service in fresh water lines... for carrying sulphuric fumes and condensation... in spray and return lines for condenser towers. For further information, write for Brochure TR-51A. Address Johns-Manville, Box 60, New York 16, N. Y.



*Transite is a Johns-Manville registered trade mark



changing bit design, Mr. Spindler noted.

The coal industry has not investigated the fundamentals of a problem in many cases. Colleges, universities and technically trained men are capable of solving many of the problems and their services should be used more in the development of new methods, Mr. Spindler said.

Indiana Institute Meet

Begins on p 80

vices, lightweight intermediate sections and so on.

In the matter of belt applications, Mr. Waldruff pointed out that a belt-conveyor assembly is designed as a unit to be operated at a specified optimum length. Therefore, coal operators should select their conveyors carefully to get maximum value for their investment. Reversibility also calls for special care, Mr. Waldruff stated, since proper training in both directions is highly important and demands careful installation. Furthermore, it may be necessary to operate the conveyor at lower speed in one direction, which may be best accomplished by installing a two-speed transmission between the drive motor and the speed reducer.

Pulleys in a tandem drive are not equally loaded, Mr. Waldruff pointed out, since the lead pulley transmits four times as much power as the tandem pulley. On the other hand, the lagging on the tandem pulley will wear out faster because of belt slippage, and, in this regard, Mr. Waldruff advocated the use of vulcanized lagging to eliminate the possibility of belt damage from rivets or bolts.

Proper training for a new belt requires that it be loaded because a new belt may be so stiff that it will not contact the all-important horizontal rollers which govern training, Mr. Waldruff concluded.

Opening feature of the afternoon session was the presentation of a new color motion picture showing the activities of the Bureau of Mines. The program also included a progress report on roof-bolting by Edward Thomas, chief, roof-control section, USBM, College Park, Md., and a statement of the Bureau's current operations by James Westfield, assistant director for health and safety, USBM, Washington, D. C.

PRESENT STATUS OF ROOF-BOLTING

Roof bolts now are being installed in the nation's coal mines at a rate of 1.95 million per month and 25.8% of bituminous production now is actually mined under roof bolts, Mr. Thomas reported in stressing the widespread acceptance of bolting in the past few years. A total of 433 mines now use roof bolts and 109 of these are 100% bolted.

During the period from July 1, 1953, to June 30, 1954, 215 roof-fall fatalities occurred among a total of 370 underground fatalities. Rates were 0.257 roof-fall fatals per million tons under bolts as compared with 1.33 roof-fall fatals per million tons in mines where coal is recovered under timber supports, Mr.



NEW CHEVROLET TRUCKS

**keep going longer,
keep going for less!**

From the day you first put it on the job until the time comes to trade, your Chevrolet truck's going to do more work for you while you spend less to keep it going. Here's why you can count on it—

INCREASED POWER SAVES YOU PLENTY

Chevrolet's high compression ratio (in each of its three great engines) develops more power. That means you go longer before filling the tank! It means, too, you've got extra power handy whenever you need it—for greater acceleration, for an easier pull up steep grades, for steadier going through mud and sand on off-the-road jobs. So, you save not only on operating costs—you save *time* as well.

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Two-ton models, for example, are equipped with heavier axle shafts. All models have newly designed clutches and stronger frames. The best part of it is that, throughout their longer life, you spend less for their upkeep. For complete details about the model you need, see your Chevrolet dealer. He'll tell you whatever you want to know, then give you the best news of all: Chevrolet trucks are priced lower than all other lines! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

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CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

THREE GREAT ENGINES—The new "Jobmaster 261" engine* for extra heavy hauling. The "Thriftmaster 235" or "Loadmaster 235" for light-, medium- and heavy-duty hauling. **NEW TRUCK HYDRA-MATIC TRANSMISSION***—offered on ½-, ¾- and 1-ton models. Heavy-Duty **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **DIAPHRAGM SPRING CLUTCH**—improved-action engagement. **HYPOID REAR AXLE**—for longer life on all models. **TORQUE-ACTION BRAKES**—on all wheels on light- and medium-duty models. **TWIN-ACTION REAR WHEEL BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—greater holding ability on heavy-duty models. **NEW RIDE CONTROL SEAT***—eliminates back-rubbing. **NEW, LARGER UNIT-DESIGNED PICKUP AND PLATFORM STAKE BODIES**—give increased load space. **COMFORTMASTER CAB**—offers greater comfort, convenience and safety. **PANORAMIC WINDSHIELD**—for increased driver vision. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—easier, safer handling. **ADVANCE-DESIGN STYLING**—rugged, handsome appearance.

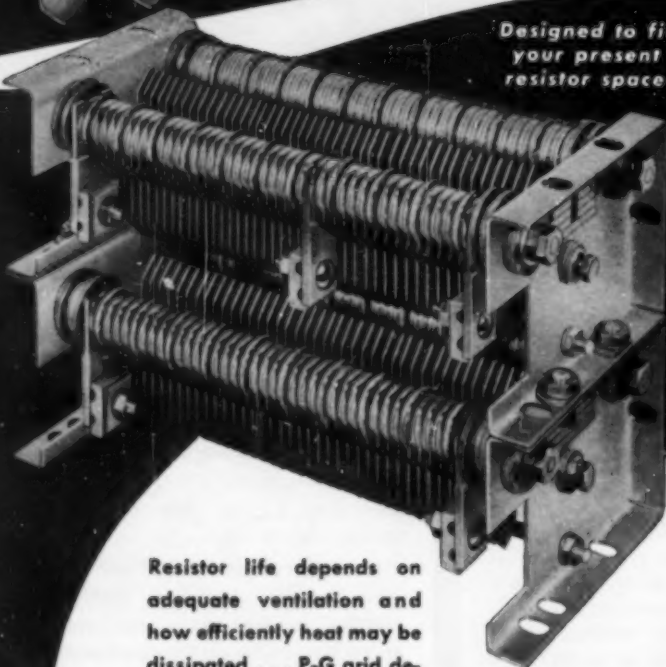
*Optional at extra cost. Ride Control Seat is available on all cabs of 1½- and 2-ton models, standard cabs only in other models. "Jobmaster 261" engine available on 2-ton models, truck Hydra-Matic transmission on ½-, ¾- and 1-ton models.

Resistor life depends on adequate ventilation...



Patented  Grid
Design assures
maximum ventilation

Designed to fit
your present
resistor space



Resistor life depends on adequate ventilation and how efficiently heat may be dissipated . . . P-G grid design equalizes the amount of air space surrounding each leg or loop to obtain even heat throughout the grid area. (Note illustration.) . . . Since heat is rapidly and evenly dissipated, hot spots fail to develop and longer resistor life is assured . . . For a nonbreakable resistor (only steel and mica used) specify P-G on your next application.



The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

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Thomas continued. Roof-fall fatalities in locations where bolts were in use numbered 13, but eight of the 13 resulted from lack of temporary supports. One was the result of cutting out some bolts to clear a wreck; another was the result of failure to follow the bolting pattern; another resulted when two posts were knocked out under weak bolted roof; and two resulted from insecure bolt anchorage in clay.

On the basis of the fatality rates for the past fiscal year, Mr. Thomas declared that 54 men now are walking around, owing their lives to roof bolting. With 100% bolting extended to all mines, roof-fall fatalities would have figured out to a total of 52 instead of the 215 that did occur.

Noting that many roof tests are made not to detect bad roof but to justify not timbering, Mr. Thomas strongly advocated the adoption of and compliance with rigid roof-support standards at individual mines and the extension of roof-bolting to properties not now doing so.

BUREAU ACTIVITIES IN COAL MINE SAFETY

"The procedures, policies and activities of the Health and Safety Div. have been changing constantly, but slowly, to meet the legal obligations of the Bureau of Mines and to improve its approach to problems," Mr. Westfield declared, in listing Bureau activities, such as, mine inspection, accident-prevention training, promotion of Holmes Safety Association work, investigation of fatal accidents, studies in roof and haulage safety, control of mine dusts and co-operation in safety matters with other agencies. Insofar as practicable, these programs will be continued and improved or expanded as experience dictates the need. Mr. Westfield said.

Special attention is to be devoted to training and Holmes chapter and council organization. Recently, 14 inspectors were given intensive training at Washington in preparation for such organizational duties. One of the Bureau's staff members already has been assigned to full-time duty as an organizer for Holmes Safety Association chapters. Mr. Westfield noted that the West Virginia Department of Mines had assigned a man to cooperate with the Bureau in this work.

In dust control, Mr. Westfield explained that the Bureau will continue to make air-borne dust surveys and will continue to seek facilities best suited for the control of such dusts.

W. Va.-AIME Joint Meet

Begins on p 90

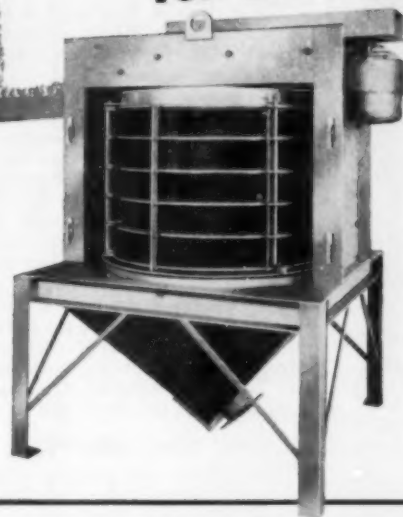
nation of streams more useful to all," he concluded.

CLEANING WITH HEAVY MEDIA

Olga Coal Co.'s new 925-tph preparation plant, which handles the friable No. 4 Pocahontas coal with equipment that includes Nelson L. Davis heavy-media washing equipment, was described by D. C. Ridenour, Olga's chief engi-

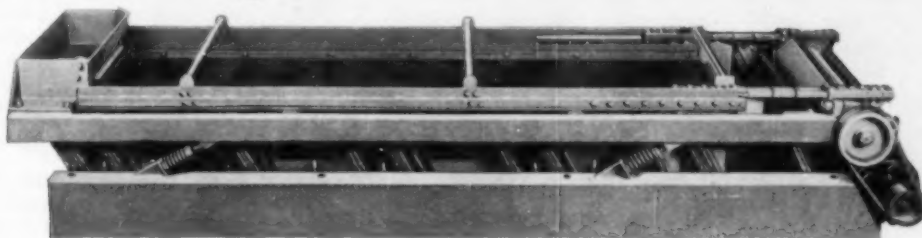
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SYMONS "V" SCREENS... effectively combine centrifugal and gravitational forces. Important advantages include: **HIGH CAPACITY — EXTREMELY ACCURATE SIZING, EVEN IN THE FINER MESHES — HIGHLY EFFICIENT DEWATERING — DUSTLESS OPERATION — FULLY ACCESSIBLE — ECONOMICAL OPERATION.**



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... in a wide range of sizes and types, all featuring: **LESS BREAKAGE AND DEGRADATION OF EVEN THE MORE FRIABLE COALS — GREATER UNIFORMITY IN GRADED SIZES — WIDE RANGE OF SEPARATIONS — SIMPLE, LOW COST INSTALLATION — LOW MAINTENANCE COST — EASILY ENCLOSED, WITH ENTIRE DRIVE MECHANISM OUTSIDE DUST AREA.**

SYMONS SCREENS have been serving the coal industry for almost twenty years, in many hundreds of screening applications throughout the world. These quality screens have gained an enviable reputation for dependability, efficiency and economy... backed by the same high standards of accuracy, design and workmanship, and the same advanced engineering that is used in the manufacture of all Nordberg Machinery.

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Fines Clean Most Efficiently on the SuperDuty Table

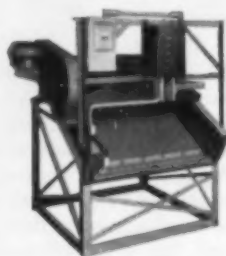


When large volumes of fine coal must be prepared, the SuperDuty DIAGONAL DECK Coal Washing Table does the best job at the lowest cleaning cost.

The reason for this is found in DIAGONAL DECK separating performance and the effectiveness of highly efficient working riffles in the natural path of material flow. You have the important advantage of accurate cutting for higher grade coal with minimum loss in the refuse, hence maximum recovery and profits.

Most new coal preparation plants employ SuperDuty tables. Whether you need one table or a battery of 50 or more, you will find your employment of the SuperDuty the most economically sound choice.

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All Leaky Screens provide differential vibration that snaps oversize wedging particles loose 1600 times per minute. When dust is a problem, totally enclosed models are available. For damp screening, FlexElex electric heating of the screen jacket insures full-time open mesh. For wet screening CON-CENCO spray nozzle arrangements are added.

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**CONCENCO
PRODUCTS**

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neer. The coal comes from the deep shaft in a dry and dusty state and about 56% goes through a ¼-in screen. About half of the 925-tph plant input is screened and loaded without processing. The hoisted coal from various sections of the mine is crushed to 8 in and stored in a 4,000-ton blending bin before going to the plant. Since all of the coals are oil treated, the storage bin is necessary to obtain the uniform loading rates required for that treatment. Uniform rate also means a minimum consumption of magnetite.

The 8 x ¼-in is distributed to any or all of three heavy-media cleaning units through de-chippers, which remove wood and thoroughly wet the coal. Mr. Ridenour pointed out. Two of the cleaning units can carry the load, thus allowing one unit to be shut down for repairs. Included in the plant are seven dust collectors moving a total of 150,000 cfm of air. All concrete floors are sloped ¼-in per foot so that all of the plant can be washed down with 50-ft hoses. The plant operating force at Olga's plant consists of 49 men, including foremen.

Answering a question, Mr. Ridenour said that to guard against the hazards of gas given off by stored coal, exhaust fans were placed at the top of the bin and no electric lights or other electrical equipment was installed in the bin.

COKING COAL RESERVES

Using slides and speaking without a prepared paper, William H. Tavenner, USBM, discussed "Problems in Correlation and Appraisal of Coking Coal Reserves in Logan and Mingo Counties, W. Va." He concentrated on the Cedar Grove seam, which he said is the most troublesome to correlate. He exhibited maps of limits of the Upper and Lower Cedar Grove beds, including lines of the "closures."

Mr. Tavenner exhibited contour drainage patterns, which he said are necessary information in tracing correlations. He said the Hernshaw seam, which has sandstone top and bottom, is a very good one to correlate from. He showed also a military range finder used in field work, equipped with alidade and plain table.

LONGWALLING WITH A PLANER

C. O. Carman, superintendent, No. 8 mine, Eastern Gas & Fuel Associates, Statesbury, W. Va., presenting a paper titled "Roof Control on Continuous Longwall," described experience of over a year with a German plow or planer in that mine and discussed theories of roof action and the various types of jacks, hydraulic and mechanical equipment available and tried in the mine. In a question period after the paper, he said that planer mining has proved better than any of the other methods that have been used in the mine. On the present or No. 2 set-up, tonnage per man on the section has been running 17.2.

Stotesbury No. 8 mine, in the Pocahontas No. 4 seam, averages 39 in and is plagued with very difficult roof, Mr. Carman said (*Coal Age*, January, 1953, p 94). The planer retreats a 350-ft wall in a panel 2,200 ft deep. Approximately

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11 ft of roof is supported at the face. The primary supports are steel and alloy collapsible props. Secondary supports are wood cribs with steel chock releases, these cribs serving also for psychological purposes. Cantilever H-section bars 39.37 in long and weighing 55 lb are used for forepole support.

At Stotesbury, the semi-longwall mining has showed the following advantages: (1) coal recovery is at maximum; (2) face ventilation is simple and efficient; (3) men work under closely timbered areas; (4) after the first fall, the roof is lowered to the floor systematically and with little noise or air concussion; (5) gradual and systematic subsidence leaves no large standing areas for accumulation of gas, which might be pushed suddenly to the face; (6) recovery of timbering material requires little new material at the face; (7) energy released as the jacks yield and the roof subsides breaks the coal, thus eliminating blasting and cutting.

GETTING READY FOR A PLANER

In a paper titled "Why We Selected Longwall Mining," Herbert E. Jones Jr., vice president—operations, Amherst Coal Co., Lundale, W. Va., described conditions in the lower bench of the Eagle seam, where a Westfalia Löbbecke planer will be installed early next year. He recounted observations on his two trips to Europe to study longwall and to buy the planer and described the machine and auxiliary equipment, which already is on the ground at the mine and awaiting development of a suitable section.

The Eagle seam is 38 to 42 in thick and is virtually clean, with only a small bone parting near the top, which normally consists of a thinly bedded shale. Bottom is a soft slate. The coal is of an extremely high metallurgical quality and very low in sulphur and ash. Up to now, the 15 yr of operation in this bench has been with handloading onto conveyors followed by small mobile loaders with bridge conveyors to the room conveyors. As the company looked into the future, further reductions in cost seemed imperative. For that reason, the German longwall method was carefully investigated. It was found to offer the best solution for the lower bench of Eagle seam, Mr. Jones said.

An abnormally bad top condition, requiring abandonment of some headings being developed for the first planer panel, has delayed installation of the planer, Mr. Jones explained. A second panel in better top is well underway. The block, 450 ft wide in a panel 2,200 ft deep, will yield approximately 110,000 tons. Total cost of the unit, \$180,000, was constituted approximately as follows: \$36,000 for electrical equipment (of American manufacture), \$110,000 for the planer and roof-support materials, \$10,000 for Panzer conveyors and \$20,000 for duty and transportation.

Non-yielding props were selected for work with the planer because the soft bottom is expected to provide sufficient yield. The plan calls for five rows of props with 125 props in each row. These rows will be 39.37 in apart in a diamond-

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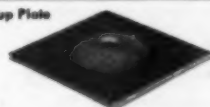


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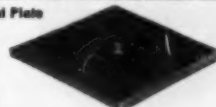
How to install



Cup Plate



Standard Plate



shaped pattern. Cribbs will be placed every 10 ft along the face. Every alternate row of props will be connected by steel headers 39.37 in in length to give the desired forepoling effect over the conveyor line.

42nd NSC Meeting

Begins on p 77

hauls under questionable roof and increasing the chances of falls. Bolting on the advance in solid work results in a negligible amount of fallen material, making it possible to attack the pillars in routine manner and to maintain a more desirable fracture line.

At Keystone (6,000 tpd) in the Pocahontas No. 3 seam, about 55% of the tonnage comes from pillar areas, Mr. Smith explained. Room entries are driven in sets of four on 90-ft centers, with sets 300 ft apart. Rooms are 285 ft deep with crosscuts at 100-ft centers, and pillars are recovered open-ended. Little difficulty was experienced until recent erratic working time created a special problem. After idle periods it was found that the rooms near the pillar pockets had caved leaving very little chance of getting to the coal before the work week ended.

A new plan was adopted which called for moving minimum gob and splitting the pillars through the center, then bringing back the stumps with a few cuts to the right then a few to the left.

The method was satisfactory for 2 mo, but then the falls appeared to be hanging back, not coming on schedule and not as sharp as before. After a 5-day idle period, an attempt was made to recover a small block in an active lift before the previous block had fully caved. A serious accident resulted when the small block proved to be the key.

Pillar splitting was discontinued and skips along the pillar from which lifts could be worked was the corrective method adopted. The new plan also called for the erection of cribs at 10-ft intervals in addition to the regular timbers along the open ends of the skips and lifts. The new plan has been in use 9 mo, Mr. Smith said, resulting in cleaner stump recovery, a fairly straight fracture line and less disturbance from falls in the pillar pockets.

At Statesbury No. 8 (2,000 tpd) in the 38-in Pocahontas No. 4 seam, a roof-control problem was encountered in the coal-planer section. A major subsidence near the center of a 330-ft-long face caught two men, resulting in death for one of the men and 5-hr entrapment of the other. In the fall, a number of the back jacks were kicked out and, since they were interlocked to the front jacks by means of I-beams, the front jacks also were kicked out. Three changes were made, including (1) the elimination of the practice of tying the steel I-beams together, (2) the substitution of jacks at the front and rear of each crib rather than built into the center of the crib and (3) the installation of a public-address system with eight speakers across the face to permit workmen to call for assistance in keeping their jacks and cribs advanced, Mr. Smith explained.

A comparison of experience under bolted roof with experience under timbered roof in mines having similar conditions was the theme of Mr. Johnson's paper. The data concern two groups of mines with three mines in each group. One group employs roof-bolting and the other conventional timbering. Two mines in each group are working the Illinois No. 6 seam and one in each group is in the Illinois No. 5, in the Central Illinois coal field.

The coal in the No. 6 seam ranges from 76 to 90 in. in thickness under from 360 to 720 ft of cover. The main roof is hard limestone, but in certain sections of each mine this main roof is separated by a clod ranging from 1 to 12 in. thick. The clod sometimes loosens soon after exposure but in other instances it sticks tight and must be taken down with wedges and sledges. Where this clod has been supported on timbers, serious accidents have occurred as a result of the clod falling between and around the supports. However, in bolting, the clod is taken down and no injuries have resulted. In areas where slate and shales, 0 to 10 ft thick, separate the coal and main roof, bolting is the principal means of support with supplementary timbers. The bolts are anchored in the main roof if possible, but where the slate is more than 6 ft thick the anchorage must be made in the slates.

A comparative summary of injury ex-

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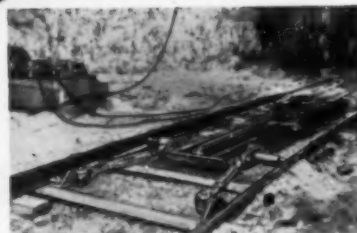
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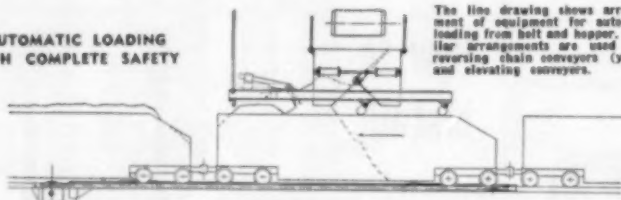


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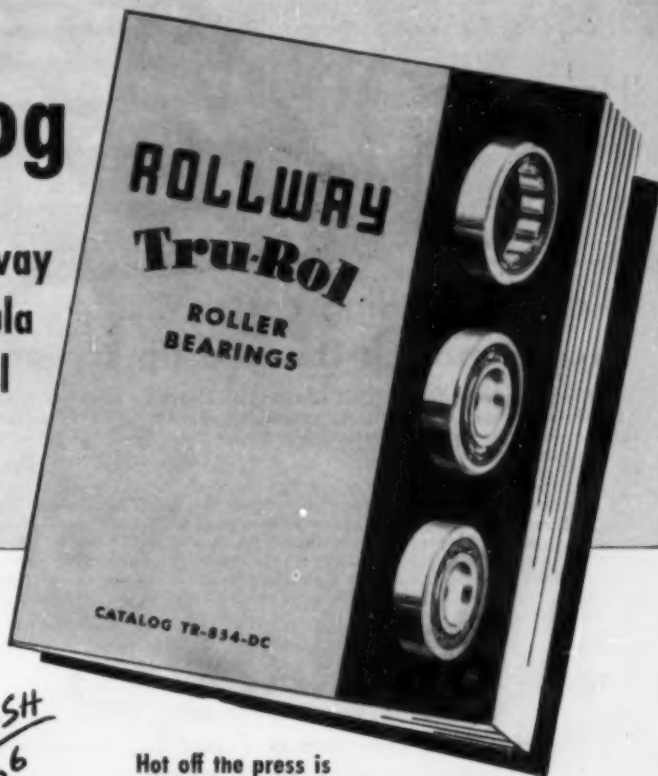
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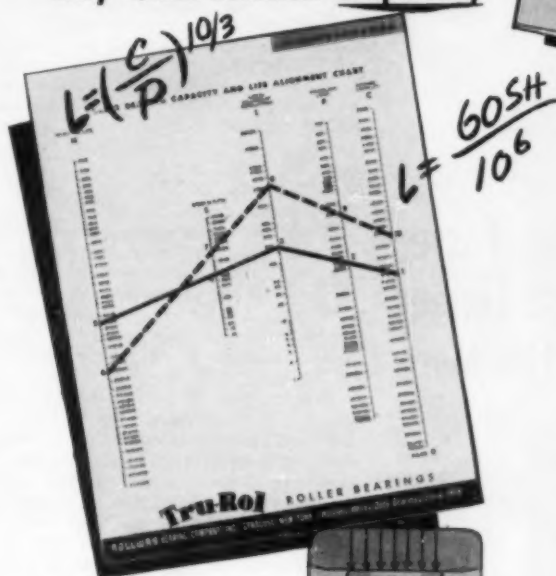
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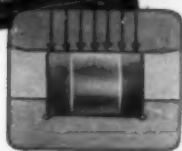
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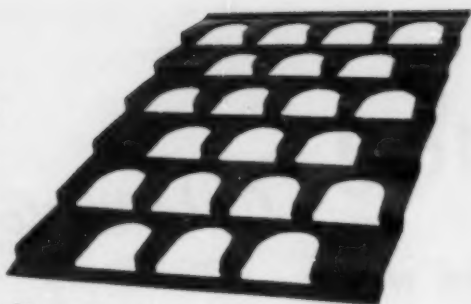
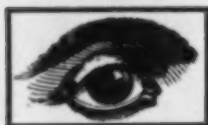
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perience, presented by Mr. Johnson, shows the following:

	Timbered Mines	Bolted Mines
Exposure, man-hr	1,719,662	1,694,249
Roof-fall injuries	69	24
Roof-fall fatalities	2	0
Frequency rate	40.12	14.16
Severity rate	8.09	0.32

SAFETY IN TRANSPORTATION

Leading off in the panel presentation on the prevention of haulage accidents, Mr. Benson declared that the installation of protective devices and engineering safeguards and the elimination of hazards are fast approaching the point of diminishing returns. The industry must become aware of the fact that the onus lies in the failure of the individual—he be manager, supervisor or worker—to recognize his own responsibility and obligation to adjust himself to his own protection and that of his fellow worker. Any future progress in eliminating coal-mine accidents will depend largely upon the effort put forth to direct and control the human factor in accident prevention.

Citing the fact that approximately 20% of all mine accidents are caused by haulage, although far less than 20% of the employees are engaged in haulage, Mr. Benson said it appears that haulage is the most hazardous of all mine occupations, though this need not be so. Closer attention to selection, installation and maintenance of equipment and proper selection and training of haulage personnel should result in safer haulage, Mr. Benson said.

Concentrating on safety in track haulage, Mr. Pero pointed out that although the annual haulage-fatality toll has been declining for the past several years, there is little room for complacency, since some of this reduction may be a reflection of changes to off-track equipment at the face.

Noting recent changes to larger mine cars and locomotives, Mr. Pero recounted the experience of railroads in attacking their early accident problems. The solution is good trackage and roadbeds, and equipment in top condition, as a starter. Then the adoption of and adherence to good safety practices rounds out the requirements for safe operation of track haulage equipment.

In this regard, rules should be simple, direct and clear. For example, by stating simply, "No locomotive, trip or other motive equipment shall operate at any time on a track used in common with any other locomotive, trip or other motive equipment without prior authority from the dispatcher," a rule has been written which places all equipment operating on a common track under the direct supervision of a responsible individual. There should be no exceptions made to this rule by the insertion of a lot of and's, if's or but's in an attempt to provide for varied circumstances, real or fancied, which might occur on an idle day or on some other such occasion. Similarly, the simple rule, "Cars shall not be coupled or uncoupled while the cars are moving," should be sufficient as an operating rule, since no exceptions



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have been made and none are intended, Mr. Pero stated.

On belt-conveyor transportation, Mr. Newman pinpointed three requirements for safe, reliable operation: proper equipment, good installation and good maintenance. In selecting equipment, the first consideration is to choose a conveyor of sufficient size and capacity to carry the load without excessive wear, breakage or spillage over the projected distance. The drive should include a large enough motor to avoid overload on peaks, the starter should include sufficient steps of resistance to prevent jerks at the splices in starting, and automatic belt controls should be provided to prevent pileups at transfer points, to protect against belt slippage and so on.

Proper installation requires careful planning, beginning at the time the entries are driven. Entry alignment and clearances must be carefully controlled and legal requirements, written primarily for fire prevention, must be considered. The conveyor must be leveled and aligned to insure proper trackage with minimum later adjustment, and controls should be installed to be accessible to personnel authorized to ride the belts and to maintenance men, he explained.

A belt conveyor would appear to be a simple way to transport material and should require very little attention, Mr. Newman said, but this thought has cost the industry many thousands of dollars in shortened belt life. After careful selection and proper installation of the conveyor, its reliability from the stand-

points of safety and efficiency is no better than the good housekeeping and maintenance programs which are established. Poor housekeeping may result in a continuous train of explosive and combustible material over the entire length of the conveyor. Daily inspection of the conveyor and its entry are necessary. Frequent inspections and servicing of the controls and drive mechanism must be a rule if constant, safe operation is to be achieved. Furthermore, strict maintenance procedures are the only sure safeguards against belt ignitions.

In reporting on 36 shuttle-car fatalities, occurring in 1952, 1953 and the first 6 mo of 1954, Mr. Kingery declared the solution to the shuttle-car safety problem requires three approaches as follows:

1. More protection for the operator—Recently, improved safety designs for locomotives have been accepted as practical. The same procedure may be helpful in shuttle-car design.

2. Reduction of known physical hazards—Though this may not be easy, better engineering and improved timbering practices probably will provide more maneuvering space. More attention could be given to timbering at critical points of low clearance, and certainly such points do not have to be concealed by ventilating curtains. Overhanging brows, ribs and obstructions on the haulage road all can be reduced with better supervision.

3. Better training—A high percentage of shuttle-car fatalities are a result of operator inexperience. They did some-

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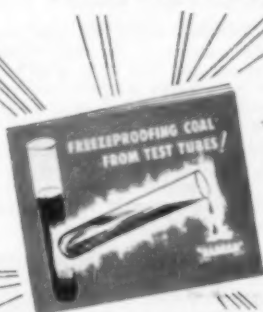
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thing wrong, failed to do something, or did not know what to do in an emergency. A man learns by doing, but it appears that too many shuttle-car operators are killed or injured before they have learned enough about their jobs to protect themselves.

Major topics at the Wednesday session included a presentation on the control of harmful airborne dusts by Dr. J. H. Kelley, research engineer, Experiment Station, Joy Mfg. Co., Saltsburg, Pa.; maintaining rock dust within 40 ft of the face during multiple-shift operations by G. W. McCaa, general manager, Jamison Coal & Coke Co., Farmington, W. Va.; and research on devices to replace frame-grounding conductors in trailing cables by L. H. Harrison, mining-

electrical engineer, U. S. Bureau of Mines., Birmingham, Ala.

DUST CONTROL, ROCK DUSTING

Using a motion picture to illustrate the dust-producing characteristics of underground mining machinery, Dr. Kelley reviewed the problem with regard to (1) the sources of harmful airborne dusts and (2) possibilities for improved dust suppression. Pointing out that modern methods designed for rapid extraction inevitably have increased the exposure hazards of face employees, Dr. Kelley minimized the usefulness of water sprays as a solution to the problem. Intensive research should be devoted to other methods, including electrostatic precipitation and the use of auxiliary exhaust

fans in face areas, Dr. Kelley concluded.

In comprehensive discussion of the industry's dust-control efforts, M. H. Forester, vice president, Pittsburgh Consolidation Coal Co., Library, Pa., declared that coal producers, researchers, equipment manufacturers and government agencies have been alert to the health hazards in the airborne dusts accompanying modern mining, and that the industry has not been lax in recognizing the problems and in taking all possible corrective steps.

Mr. McCaa's paper on rock-dusting in multiple-shift mining was read by Howard G. King, construction engineer, Jamison Coal & Coke Co., Farmington, W. Va. In describing a mine using 9 lb of rock dust per ton of coal mined, Mr. McCaa explained that since the mine produces about a million tons per year the annual rock-dusting costs are \$65,000 with per-ton costs as follows:

Rock-dust material cost	..... 3.5c
Rock dust delivered to section	.. 0.2c
Section face rock dusting	..... 1.5c
Other section rock dusting	..... 1.0c
Mainline rock dusting	..... 0.3c
Total, per ton of coal	..... 6.5c

The mine is located in northern West Virginia in the Pittsburgh seam, the coal is inherently dry and dusty. Several sections are double-shifted, permitting adequate rock dusting on the third shift. The remaining sections are triple-shifted, consisting of from seven to nine places worked in rotation. These places advance from 25 to 30 ft every 24 hr thus, to

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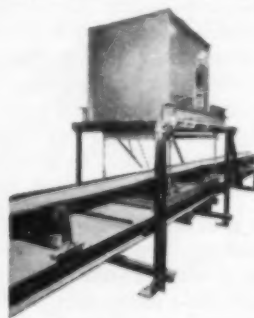
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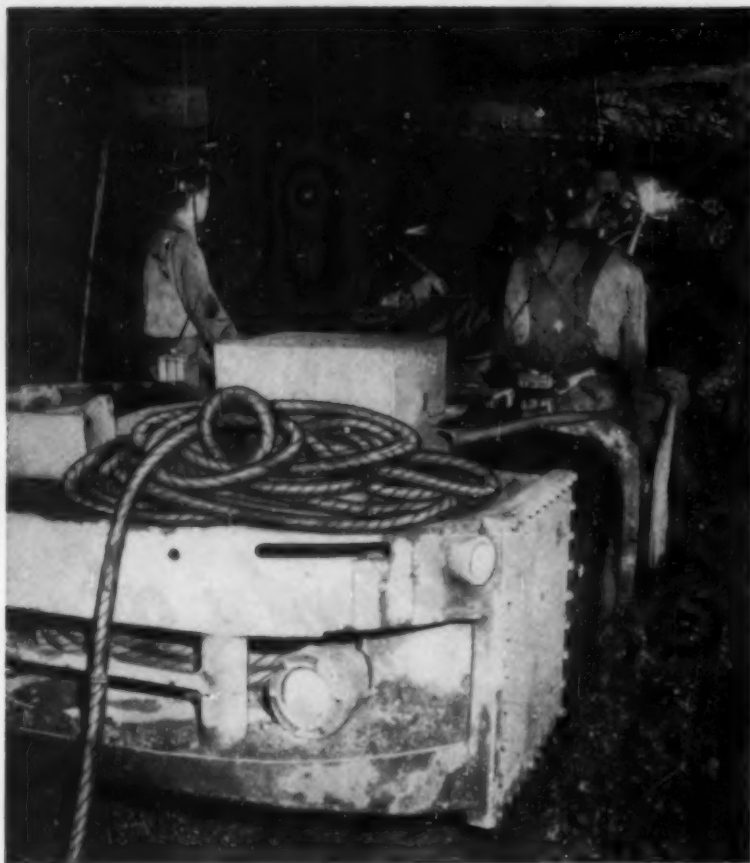
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keep within the 40-ft requirement demands rock dusting every day. The interval between shifts is from 45 min to an hour. On each of two shifts daily a crew of three men stays over to rock dust half the places with a Bantam rock duster which is hauled in a shuttle car along with the necessary rock dust. The payment of time-and-a-half labor for this work is justified since the 14 men in the producing crew are able to prepare and load coal for their entire shift. Rock dusting in return airways in the section requires about 3 man-hr per day.

At the end of each week, 2 hr of additional dusting is done by a 3-man crew with particular emphasis on dusting at the shuttle-car discharge point and along shuttle-car roads. The mainline requires one shift per week with a 3-man crew and once a month the panel haulage roads approaching the sections are dusted using a high-pressure, track-mounted machine.

This is actual procedure in a mine using conventional equipment, Mr. McCaa said, in pointing out that the problem of keeping rock dust within 40 ft of the face is even greater in continuous mining. A possible solution is the development of some method of applying rock dust in a slurry while other equipment may continue to operate.

In discussion, George Alston, development engineer, Mine Safety Appliances Co., Pittsburgh, reported that a nozzle now is being tested which will introduce moisture into the stream of rock dust leaving the Bantam machine. L. H. Johnson, safety engineer, Peabody Coal Co., Taylorville, Ill., described his company's successful efforts in preparing a slurry of rock dust in a special tank employing compressed air for agitation. The air also is used for application of the slurry, through 500 ft of hose in some instances.

NEW IDEAS IN FRAME GROUNDING

There have been objections to the use of a grounding conductor in trailing cables, Mr. Harrison said, in explaining that the space limitation is critical in applications requiring that the cable be taken up on a reel and that splicing may not be satisfactory since the grounding conductor may be forced to assume more than its share of the strain or may be parted and cut back from the splice area. The search then is for some improved method of grounding which will provide protection equivalent to that obtained from a ground conductor built into the cable.

Noting a dearth of practical ideas for accomplishing these ends, Mr. Johnson listed these desirable characteristics of an acceptable grounding device:

1. It should provide reliable and effective protection from the shock hazard in case of insulation failure.
2. It should provide reliable and effective protection against ignition hazards resulting from the transfer of current between the frames of face units.
3. It should provide protection against shock hazards resulting from differences

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of potential between the frames of adjacent equipment or equipment and ground.

4. It should be simple, rugged, practical and economical.

5. It should be applicable to all types of equipment and power-supply circuits.

New developments in the field include the use of polarized-relay devices, a polarized short-circuiting device and electronic devices. Some of the schemes appear to be unsuited for use in underground mines, some show promise of providing the desired protection, and there remains a need for the development of new ideas in grounding practice, Mr. Harrison said.

AIME-ASME Conference

Begins on p 88

At the opening session on Thursday morning, W. I. Collins, district sales manager, Babcock & Wilcox Co., Pittsburgh, spoke on small and medium size applications of the cyclone furnace, followed by J. M. MacLachlan, fuel engineer, Pittsburgh Consolidation Coal Co., Library, Pa., on traveling-grate application experience with strong caking coals. Co-chairmen of the opening session were P. D. Oesterle, sales manager, piping department, Dravo Corp., Pittsburgh, and C. H. Hardy, chief engineer, Appalachian Coal, Inc., Cincinnati, Ohio.

CYCLONE FURNACE

Approximately 70% of the coal mined in this country in 1950 would have been suitable for use in cyclone furnaces, Mr. Collins reported. Generally the fuel characteristics that have been proven best suited for cyclone furnaces are found in the lower grade and cheaper coals. Because the cyclone furnace is ideally suited to burn the cheapest fuels available in most locations, one large utility has been able with cyclone burners to reduce fuel cost 40¢ per ton by buying from a greater number of sources.

The performance of the cyclone furnace has made possible better functional designs of boilers, improved operating conditions and reduced the problems of air pollution. These have been obtained with reductions in both capital and operating costs, Mr. Collins said.

Advantages of the cyclone furnace cited by Mr. Collins are as follows:

1. It can handle a wide variety of coals and is easily adapted to the firing of liquid and gaseous fuels.

2. It operates with only 10% excess air and carbon losses are exceedingly low. Therefore, for comparable stack-gas temperatures, the boiler-unit efficiency is higher than that obtained with pulverized-coal or stoker-fired units.

3. Operation is simple and reliable.

4. A single unit can burn three or four times the quantity of fuel fired by typical pulverized-coal burners. Thus fewer burners are required.

5. Because of simplicity, reliability and capacity for high burning rates, the unit is easily adapted to remote control with a minimum of apparatus and interlocks.

6. Stack dust loading is less than that

with pulverized-coal-fired units with dust collectors.

7. Ash disposal in the form of granulated slag is simpler than with fly ash.

8. Stack dust is finer from the cyclone furnace and therefore settles much slower than dust from pulverized or stoker-fired furnaces.

9. Maintenance costs are lower.

10. Auxiliary power requirements are lower.

11. Availability of cyclone furnaces is excellent.

TRAVELING-GRATE STOKERS

The most acceptable fuel for use in chain- or traveling-grate stokers in the Pittsburgh area is shallow-cover, strip-mined and relatively weakly coking slack. Mr. MacLachlan declared. This fuel does a good job and is low in cost. Double-screened deep-mined coals with top size not exceeding $1\frac{1}{4}$ in do a satisfactory job but are more costly than slack sizes. Deep-mined slack usually requires tempering water and is generally more troublesome on chain- and traveling-grate equipment than the double-screened deep or low F. S. I. strip coal.

At present, shallow-cover strip coals are plentiful but the extent of the reserves of the low F. S. I. has not accurately been determined. A cooperative investigation is needed in the Pittsburgh region to assemble information on coal reserves, suitable sizes and grades of available coals for application to this type of stoker, and to reach closer agreement and design configurations to best handle the economical sizes of deep-mined, strongly caking coals, Mr. MacLachlan continued.

Total steam cost, as it applies to the stoker, is influenced by the following major factors: initial investment, direct fuel cost, efficiency of combustion, labor cost and maintenance. A dump-grate stoker with auxiliary equipment costs 5% less than a traveling-grate unit while a continuous ash-discharge spreader costs about 10% more than the traveling-grate installation. Fuel costs are below those for other types of stokers and operating labor is as low or lower than that needed for any other type of stoker. Maintenance costs also are low, he noted.

Properly operated traveling-grate stokers with correct coal application never violate the local air-pollution ordinances. Except for extreme cases, chain- and traveling-grate stokers carry load swings without recourse to premium fuels, Mr. MacLachlan concluded.

At the afternoon session on Thursday, W. H. Tavenner, mining engineer, USBM, presented J. J. Dowd's progress report on the Bureau of Mines estimate of coking coal reserves; F. W. Smith, chief, coal carbonization section, USBM, spoke on the coking properties of Pittsburgh district coals; and A. H. Brisse, chief research engineer, coal & coke, U. S. Steel Corp., discussed the selection of coals for coking. Co-chairmen of the session were C. H. Sawyer, research engineer, Eastern Gas & Fuels Associates, Pittsburgh, and C. L. Potter, research engineer, manager coal and coke re-

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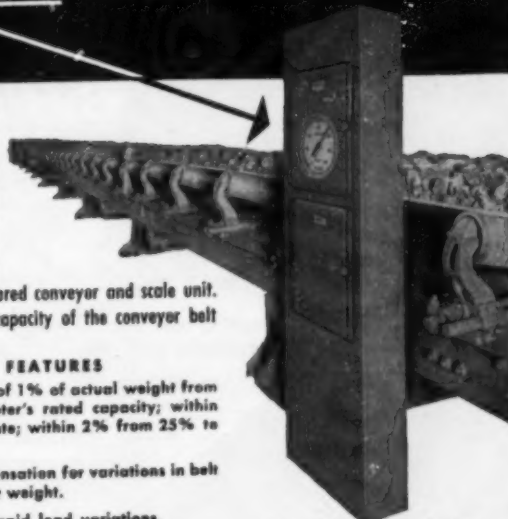
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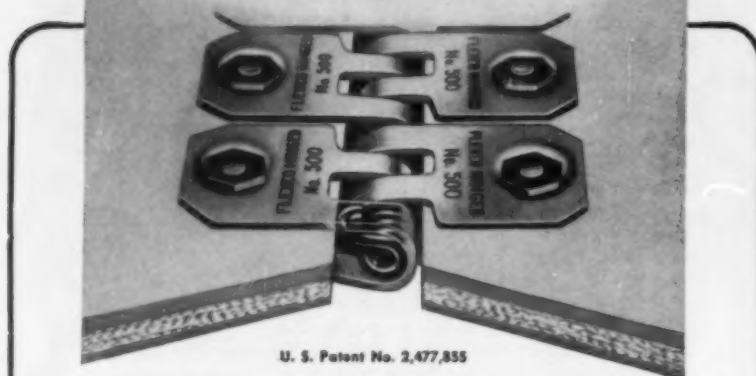


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COKING-COAL RESERVES

The Munitions Board of the National Military Establishment realized the necessity of adequate reserves of coking coal for steel production over any period of emergency and requested the Bureau of Mines to estimate reserves of coal that are or could be made suitable for manufacturing metallurgical coke, Mr. Tavenner said.

As both the economic and technological factors that determine whether a particular coal can be used for producing a metallurgical coal will vary with changing conditions, the study was planned to cover three phases. The initial stage of the study was to determine from available data the reserves with coking properties which occur in beds thick enough and within depths considered to be economically minable under future conditions, he said.

Coal reserves by counties have been made in Pennsylvania and West Virginia by the respective state geological survey departments. In each published Bureau estimate, a comparison of the total remaining reserves was made with the most recent State estimate. In every county report completed to date, the Bureau estimate of recoverable reserves has been very much smaller than that of the corresponding state estimate. The main reasons for the difference are: (1) the state report usually includes large quantities of inferred reserves and (2) the percentage of recovery in mining estimated by the state usually is larger than in actual practice, Mr. Tavenner explained.

COKING PROPERTIES

In selecting coals for the manufacture of metallurgical coke, more factors must be considered than for any other major use, because at present no basic industry requires coal of such high quality and uniformity, Mr. Smith said, in discussing the coking properties of Pittsburgh-district coals. This is particularly true in the Pittsburgh district where high quality coals have been carbonized ever since the industry was founded and blast furnace practice is based on cokes from high-quality coals. In the evaluation of coals for coke making, attention is given to (1) reserves, (2) ash and sulphur content, (3) inherent properties and (4) blending properties.

As a result of the tests carried out on the Pittsburgh-area coals, Mr. Smith said the following conclusions were made:

1. High-volatile coals from the Pittsburgh, Upper and Lower Freeport, Upper and Lower Kittanning, Winifrede, Chilton, Cedar Grove, Alma, No. 2 Gas, Eagle and Sewell beds are suitable metallurgical coals if they contain more than 60% dry, mineral-matter-free, fixed carbon and are not high in sulphur and ash.

2. Medium- and low-volatile coals from the Upper and Lower Freeport, Upper and Lower Kittanning, Bakerstown, Eagle Sewell, Beckley, Fire Creek, and Pocahontas Nos. 3, 4 and 6 are good

blending coals even though they vary greatly in properties.

3. Coke tumbler stability and hardness are related to the proximate analysis of the coal and form a reasonable basis for predicting the strength of cokes from Pittsburgh, Upper and Lower Freeport, and Upper and Lower Kittanning coals.

4. The tumbler indexes of cokes made from single high-volatile coals correlate well with those of cokes from their binary blends containing 20% Pocahontas or Beckley low-volatile coals.

5. Although the expanding property of high-volatile coals is not closely correlated with rank, the expansion of their blends with Pocahontas No. 3 low-volatile coal can be closely estimated from the expansion of high-volatile components.

6. In general, blends containing 20% Pocahontas No. 3 coal contract or are neutral if the high-volatile component contracts more than 9%; they expand if the high-volatile component contracts less than 9%.

SELECTION OF COKING COALS

What do we want with coking coals in the steel industry? Mr. Brisse asked as he opened his discussion of selecting coals for coking. The ultimate aim of research work at U. S. Steel is to improve blast-furnace performance. Several important things learned are that the strength of the coke must be such that it will maintain its size consist when handled in the plant and that analysis of the coke must be that which is best for the furnace.

There is an overwhelming effect on yield by the strength of the coke. Therefore, effort is directed toward getting stronger coke at the coke plants. It is desirable to have a coke that holds up well until it reaches about 1,500 deg F and then breaks down. As long as high-silica ores are being used, high quantities of sulphur can be absorbed. But if Venezuelan ores are used, then the sulphur in coal is very important, Mr. Brisse said.

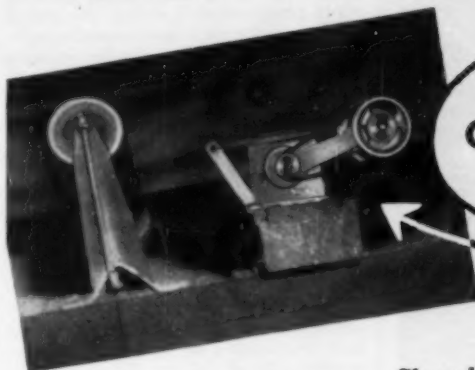
Amazing changes in strength of coke can be obtained by a change in the ash content and in some cases it is possible to get a stronger coke by putting some of the middlings back into the clean coal. Coal petrography also is very important in selecting coking coals and is being used more frequently for that job, Mr. Brisse declared.

At the Friday morning session, C. W. Gordon, manager, Raymond Division, Combustion Engineering, Inc., Chicago, spoke on air pollution problems with heat drying of fine coal, followed by H. F. Hebley, research consultant, Pittsburgh Consolidation Coal Co., Pittsburgh, on problems encountered with industrial waste water. Co-chairmen of the session were T. S. Spicer, research professor, fuel technology, Pennsylvania State University, State College, Pa., and H. L. Washburn, research engineer, Pittsburgh Consolidation Coal Co., Pittsburgh.

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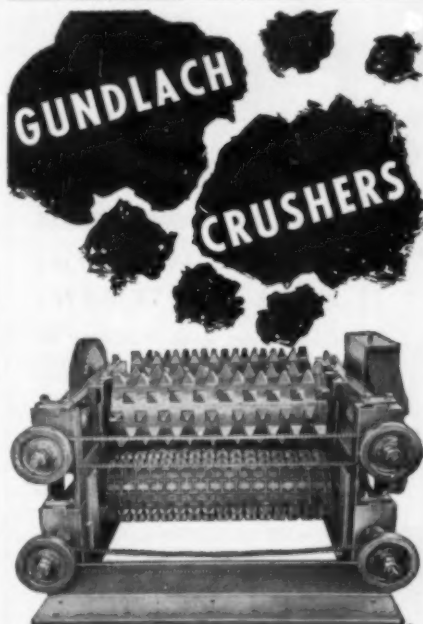
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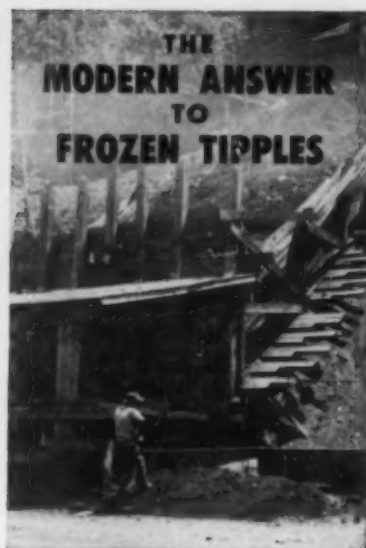
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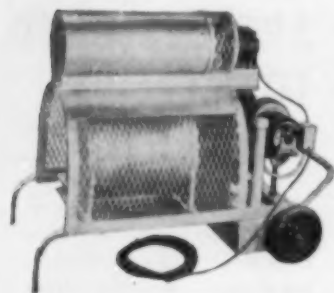


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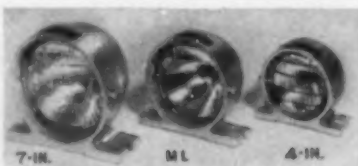
THE SILENT GLOW OIL BURNER CORP.
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Mr. Gordon reported. The first is to prepare the particle for separation by flocculation, by wetting or by charging for electrical precipitation; and the second is the actual separation of conditioned particles.

Heat drying of coal has been extensively practiced only during the past 8 to 10 yr and with it has come the problem of pollution. The ultrafine particles vented from the cyclone combined with dust loadings from 0.40 to 3.00 grains per cu ft present a severe secondary dust-collection problem. Types of secondary collectors in use today include bag filters, high-efficiency small cyclones and wet scrubbers. A fourth type, electrostatic precipitators, have been widely used in Europe but there are no installations in this country, Mr. Gordon noted.

Bag filters have not been a complete success as secondary collectors. They are highly efficient as dust collectors, but they are subject to fires and inert-gas control systems are not always reliable. Collection efficiency with small cyclones ranges from 40 to 60%. Wet scrubbers of various designs have been used with varying success. A well-designed scrubber will operate at a minimum collection efficiency of 90%. However the big problem with wet scrubbers is corrosion, Mr. Gordon said.

Coal and other industries must co-operate in an anti-pollution program, Mr. Hebley declared, in discussing problems encountered with industrial waste water. Research has been carried on by the various industries but much still re-



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Type 7 IN is a utility headlight using standard automobile lamp, two filaments, to project the beam either close or far.

Type ML for main line locomotives has a narrow powerful beam (70,000 beam C.P.). Furnished also for 32 and 115 volts.

Type 4 IN is recommended for gathering locomotives, shuttle cars and loading machines.

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mains to be done if the problem is to be solved.

At the afternoon session on Friday, R. C. Beerbower, Jr., superintendent, Karen mine, U. S. Steel Corp., West Brownsville, Pa., spoke on the Konnerth miner; M. A. Schoffner, general manager, Freebrook Corp., Kittanning, Pa., described highwall mining in a thin seam with a Colmol and extensible belt conveyor; K. S. Hobbs, production engineer, Eastern Gas & Fuel Associates, Grant Town, W. Va., discussed performance of the Goodman 500 miner; Stephen Canonico, president, Compass Coal Co., Clarksburg, W. Va., spoke on experience with the Joy CM2 continuous miner; and Morgan Williams, general manager, Oglebay Norton Co., St. Clairsville, Ohio, described results with Joy continuous miners with an extensible belt conveyor. Co-chairmen at the session were M. H. Forester, vice president, Pittsburgh Consolidation Coal Co., Pittsburgh, and C. B. Tillson, superintendent, Crucible mine, Crucible Steel Co. of America.

CONTINUOUS MINING

Konnerth miner, R. C. Beerbower, Jr. —Development of the Konnerth miner and its use at the Karen mine, U. S. Steel Corp. Details of this operation were described in *Coal Age*, June, 1954, p. 76.

Highwall mining with a Colmol and extensible belt, M. A. Schoffner—A complete description of this mine appeared in *Coal Age*, October, 1954, p. 96.

Goodman 500 miner, K. S. Hobbs—Early experience with the Goodman 500 at Grant Town, said Mr. Hobbs, indicates a production capacity of 3.33 tpm. Penetration has been as high as 14 in per minute and 18 in per minute probably will be possible in pillars. As a result of the application of the new machine, management is convinced that production will be revolutionized.

The machine currently is used to develop three headings, with breakthroughs turned at 60 deg. Auxiliary equipment used with the miner includes a pickup loader, two shuttle cars and a belt conveyor in the panel. Section personnel includes 1 foreman, 1 miner operator, 1 loader operator, 2 shuttle car operators, 1 utility man, 1 mechanic, 1 boom man and 2 roof-bolters on the first shift only.

Roof jacks are used to support the roof at the face and roof bolts are used only to support bad roof. Bolting required is less than one-half that needed with conventional equipment.

Joy CM2 continuous miner, Stephen Canonico—The Joy CM2 unit at Compass Coal Co. is the first unit of this model in operation to date, Mr. Canonico declared, and experience with it has been limited. The unit is working in the Pittsburgh seam which averages about 8 ft in thickness. Approximately 7 ft of coal is recovered by the continuous miner. Numerous clay veins, ranging in thickness from a few inches up to 4 ft are encountered.

Roof conditions range from fair to poor and roof is controlled with crossbars and roof bolts. The bottom is a 6-in layer of coal and shale, underlain by fireclay.

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Three headings, 15 ft wide on 60-ft centers are being developed with the miner. Breakthroughs are driven 90 deg with the headings on 80-ft centers. The mining cycle consists of advancing 80 ft in the No. 1 heading, 80 ft in No. 2, 80 ft in No. 3 and then cutting a breakthrough from No. 3 to No. 1. Wood crossbars are set on steel jacks between shuttle car changes as the miner advances. Jacks are later replaced with wood legs. Roof-bolting currently is done on the third shift but will be done on shift as soon as a rotary drill is installed on the miner.

Production during the month of September, 1954, averaged 425 tons of clean coal per shift. An analysis of production for the month is as follows:

10 shifts	over 500 tons
17 shifts	400 to 500 tons
7 shifts	300 to 400 tons
5 shifts	under 300 tons
Best shift	604 tons
Worst shift	129 tons

Delays during the month were 20 hr for the continuous miner and 29 hr for the shuttle cars.

Section personnel consists of the following: 1 foreman, 1 mechanic, 1 continuous miner operator, 2 shuttle car operators, 2 timbermen and 1½ roof bolters on third shift, a total of 8½.

Results of screen tests on coal mined by conventional and continuous mining methods are as follows:

Size	Continuous Mining	Conventional Methods
Plus 2 in	26.3%	29.7%
2 x ¾	41.4%	39.3%
¾ x 0	32.0%	31.0%

A more detailed breakdown of size consist is as follows:

Size	Continuous Mining	Conventional Methods
Plus 2 in	26.6%	29.5%
2 x 1¼	10.95	13.70
1¼ x 1½	23.97	22.85
½ x ¾	6.79	6.35
¾ x ¼	7.70	7.17
¼ x ¼	10.50	7.20
¾ x 40M	10.36	9.96
40M x 100M	1.82	2.14
100M x 0	1.31	1.13

Future plans call for possible addition of an extensible belt conveyor. Management feels that all the possibilities of the machine have not been exhausted.

Joy continuous miners with extensible belt, Morgan Williams—The continuous miner was installed in the fall of 1953 and the extensible belt was added in the spring of 1954. Mr. Williams said, in describing results in the Pittsburgh No. 8 bed. Rooms are driven 17 ft wide on 30 ft centers and pillars are not recovered because of the soft roof. Entries are driven 2,000 ft and rooms are driven 600 ft deep with the extensible belt. No delays have been experienced other than the 3 or 4 min required to add a 100-ft section of belt.

Output per unit shift has been 275 tons or 55 to 60 tons per man. With conventional methods output ranged from 37 to 41 tons per man.

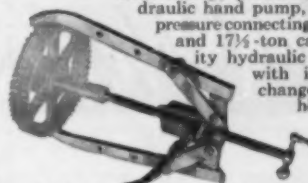
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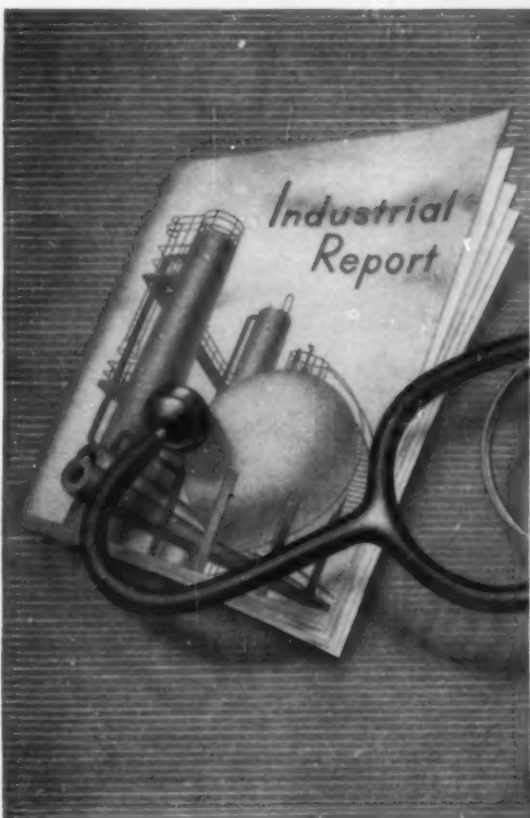
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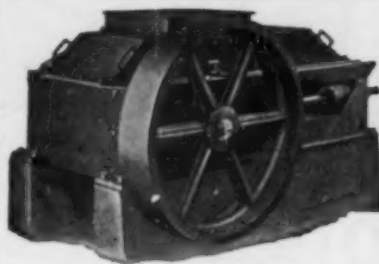
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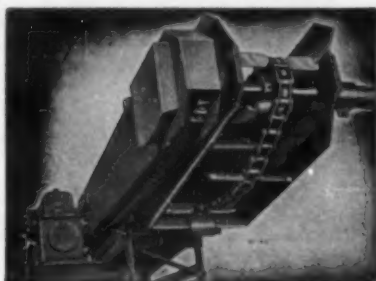
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- 5—11BU Joy Loaders, type 10APE, 250 volts, DC Permissible.
- 2—8BU Joy Loaders, 250 volts, AC.
- 2—8BU Joy Loaders, 250 volts, DC.

LOCOMOTIVES

- 8—15-ton Jeffrey type MHT7, ball bearing motors, air brakes, 42" gauge, now in 1946, now type resistance, locomotives are as good as new. Overall dimensions: length 14'7", width 5'2", height from rail 40", outside armor steel frame 5'4". Can be made 30" gauge.
- 5—15-ton Goodman, type 35-A-64C, 42" gauge, ball bearing motors, overall dimensions: length 14'7", width 5'2", height from rail 40", outside armor steel frame.

- 2—15 ton Jeffrey, type MHT 74, ball bearing motors, 42" gauge, outside armor steel frame, overall dimensions: length 14'7", width 5'2", height from rail 40".

- 1—10 ton Jeffrey, type MHT 148, ball bearing motors, ball bearing journals, 42" gauge, late type.

- 58—4 ton Jeffrey MHT 58, ball bearing motors, complete with gathering reels and new type steel resistance, 42" gauge, overall dimensions: length 13', width 48", height from rail 30". Locomotives in perfect condition, ready to go to work without spending a cent on them.

- 25—4 1/2 ton Mancha battery locomotive, complete with practically new Gould and Exide batteries, 48 cells with 27 and 20 plates. Batteries have been fully charged, and some used less than 6 months. Overall dimensions: length 12', width 40", height from rail 42", height of battery box only 20". We can make a special price for either the complete locomotive with the batteries, or the batteries alone.

Also many 5 to 12 ton Jeffrey and Goodman locomotives in gauges from 30" to 48".

MINING MACHINES

- 1—10 BU, 250 volts, DC, late, in perfect condition, permissible.
- 4—512 RJH Goodman, 250 volts, DC, 8 1/2' cutter bars with hydraulic jacks and bug dusters, complete with Joy T1 Cat Trucks, Permissible.
- 3—512MJA Goodman, 250/440 volts, AC, 8 1/2' cutter bars, with Joy T1 Cat Trucks.
- 6—TB-1 Bullfinch, 250 volts, DC, 8 1/2' cutter bars, complete with Bug dusters, permissible, with Joy T1 Cat Trucks, permissible.

MOTOR GENERATOR SETS

- 1—300 KW Ridgeway, 2200 volts, 250 or 275 volts, DC, 1200 RPM, complete with switchboard.
- 2—200 KW General Electric, 2300 volts, AC, 275 volts, DC, 1200 RPM, complete with fully automatic switchboard.
- 1—200 KW Westinghouse, 2300 volts, AC, 275 volts, DC, 900 RPM with automatic circuit breaker for DC and manual starter for AC.
- 3—150 KW Westinghouse, 2300 volts, AC, 275 volts, DC, 1200 RPM, complete with fully automatic switchboard.
- 1—150 KW General Electric, 2300 volts, AC, 275 volts, DC, 1200 RPM, complete with fully automatic switchboard.

MISCELLANEOUS

- 150—7 ton ACEF all steel drop bottom mine cars, 14' long, 7' wide, 49" high, 49" gauge, 16" wheel, like new.
- 12—42D Joy battery shuttle cars, excellent condition, cheap.
- 5—MRA permissible bantam rock dusters, and type R track mounted.
- 5—4' x 10' Selecto single and three deck vibrators.
- 2—6' x 14' Robbins Gyrex two deck vibrators.

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500	G.E.	22000	2300/4000	3
400	G.E.	2300	230/460	3
200	G.E.	22000	2300/4000	3
200	Allis Ch.	2400/4100	240/480	3
200	Pgh.	22000	220/440	3
125	West.	11000	2300	3
100	Davis	2300/4000	230/460	3
75	G.E. (Pyranol)	2400/4100	120/240	3
65	G.E.	2300/4000	200/400	3
55	Kuhman	4-0	110/220	3
37 1/2	G.E.	11000	230/480	3

* 3 phase unit.

MOTOR GENERATOR SETS

- 400 KW West. 330 v. 7200-Rys.-SK 2300/4000 v.
- 300 KW West. 275 v. 1200 R-Syn. 2300 v.
- 300 KW G.E. 275 v. 1200 MPC-AT1 2300/4000 v. Full automatic.
- 200 KW G.E. 275 v. 1200-MPC-AT1 2300/4000 v.
- 200 KW Ridg. 275 v. 900-R-Syn. 2300 v.
- 150 KW G.E. 275 v. 1200 R-MPC-AT1 2300/4000 v.
- 100 KW Ridg. 275 v. 1200-R-Syn. 2300 v.

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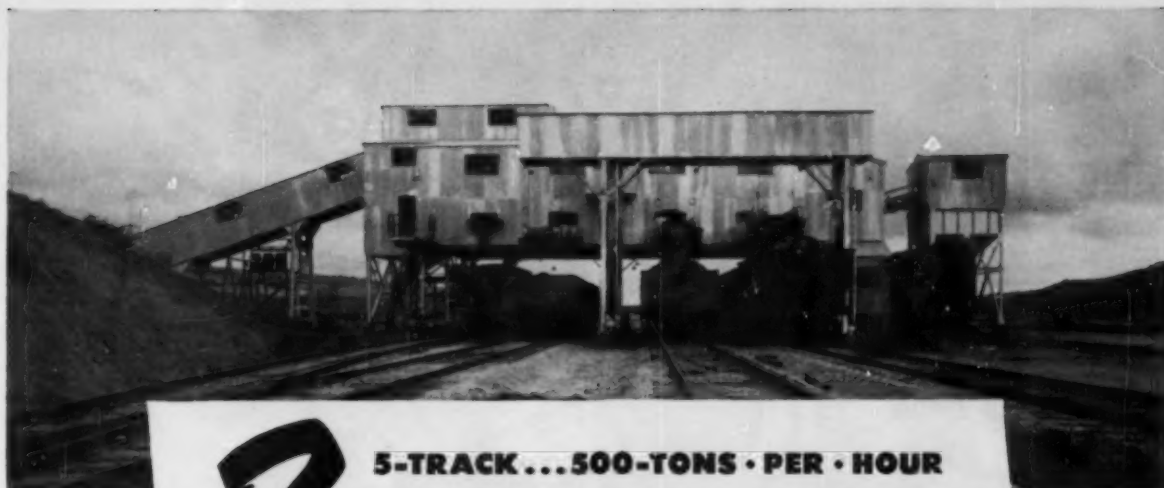
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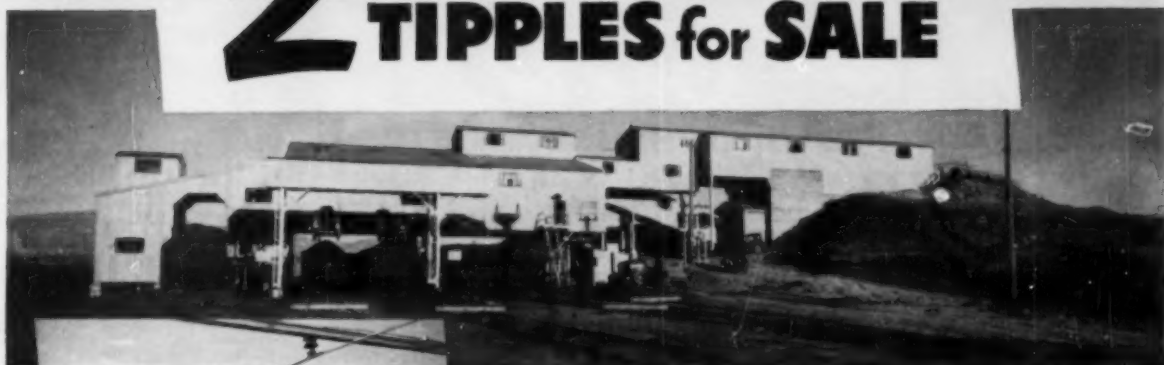
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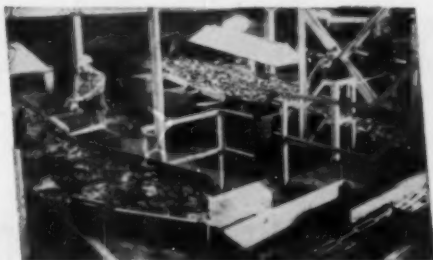
*Above: Tipple at Hanna, Wyoming, up track.
Below: Tipple at Reliance, Wyoming, up track.*



Pit cars at Reliance rotary dump station



Main shaker and drive at Hanna



Picking tables at Reliance

These all concrete and steel tipples, by Allen and Garcia, are in good operating condition, at bituminous mines nationally known for their excellent safety records.

Gravity rotary dump at each tipple handles 137 cu. ft. steel mine cars, with 25 h.p. pit car feeder and quick reading scale. Dump cars go by gravity over kickback to trip maker.

The tipple at Hanna includes also a 50-ton strip coal dump hopper with 100 ton scales and handling equipment recently installed.

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The Union Pacific Coal Co.
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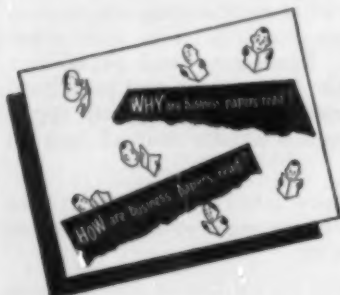
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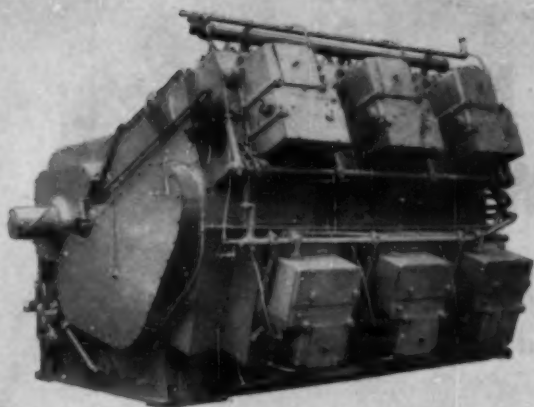


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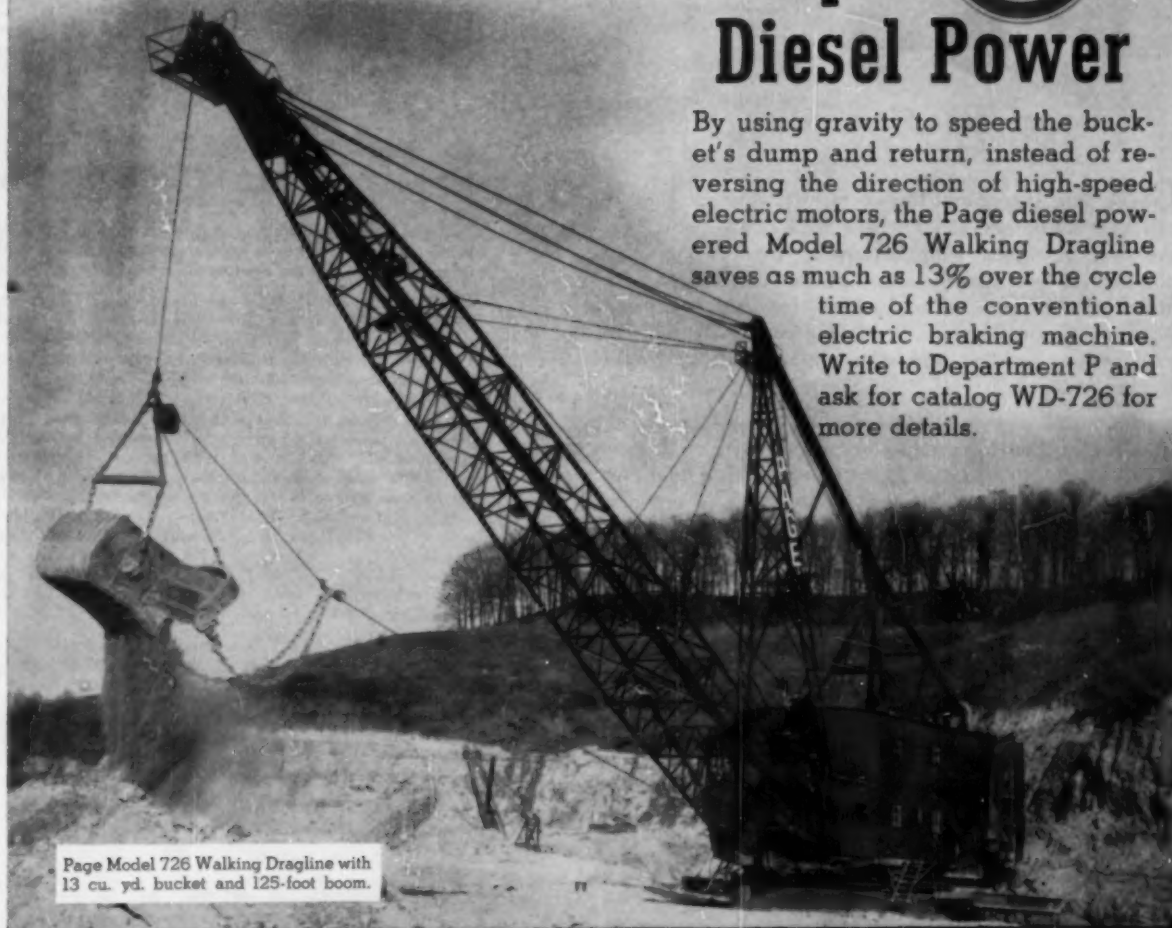
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Page Engineering Company custom builds the new V-type, Horizontal Diesel Engine, shown at left, in order to allow the use of larger, more economical, draglines of capacities up to 20 cu. yds. Like the time-tested Page inline diesel, the V-type takes advantage of medium speed, parts interchangeability and complete accessibility of all moving parts to insure economy of operation and low maintenance costs.

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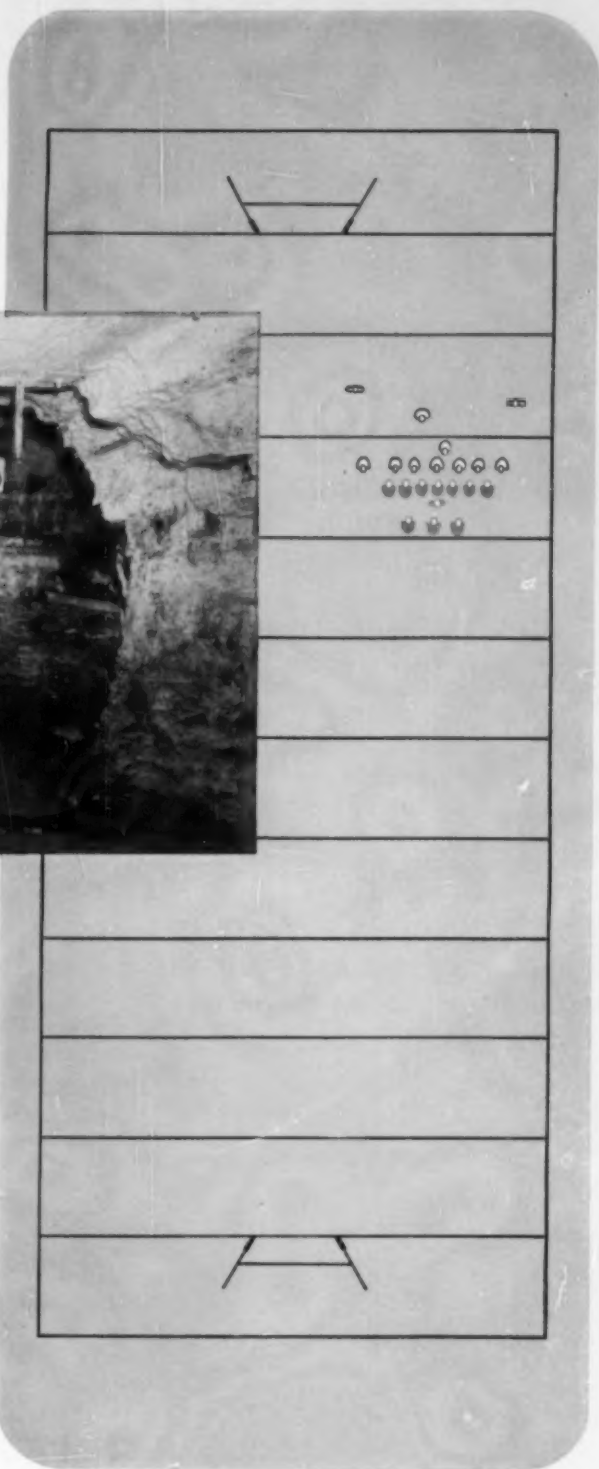


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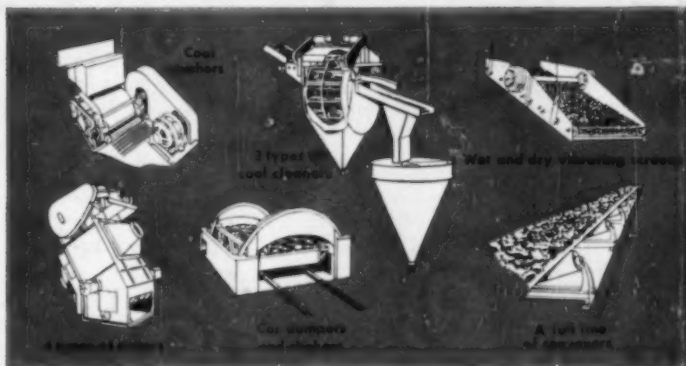
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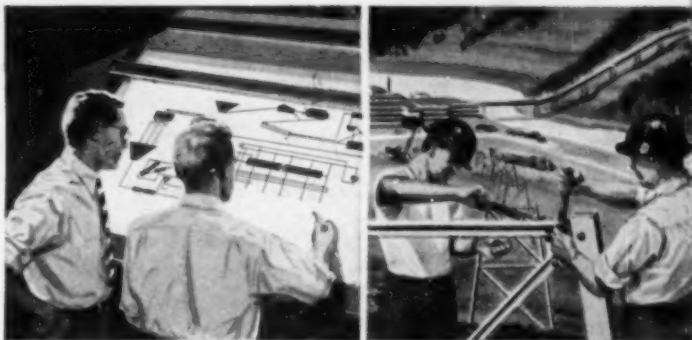
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